JULY • 1949

TOOL & DIE JOURNAL

TOOLING and PRODUCTION

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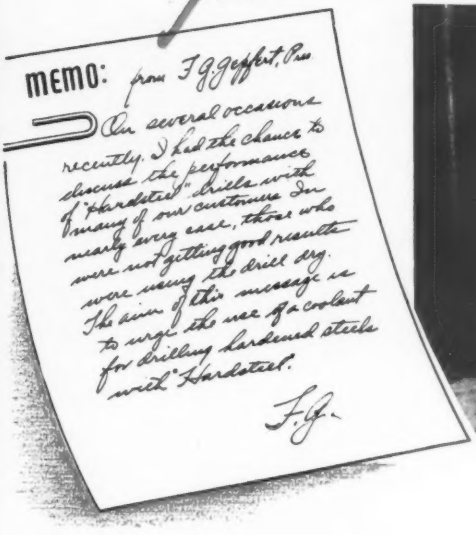
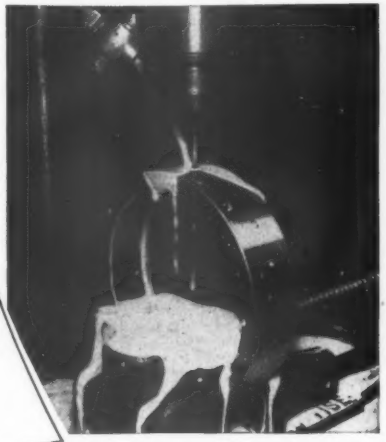
with Coolant

DRILL HARDENED STEELS

faster and better!


memo: from Jiggerfist, Pres
On several occasions recently, I had the chance to discuss the performance of "Hardsteel" drills with many of our customers. In nearly every case, those who were not getting good results were using the drill dry. The aim of this message is to urge the use of a coolant for drilling hardened steels with Hardsteel.
F.J.



"HARDSTEEL" Drills, Tool Bits and Special Tools are solving many production problems. Write for your free copy of the "HARDSTEEL" Operator's Manual. Also inquire about "HARDSTEEL" as a metal for special parts that must meet unusual conditions of service.

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- **Less skill needed**
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- **No discoloration**
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- **More, better work from each drill**

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TOOL & DIE JOURNAL

TOOLING AND PRODUCTION

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TOOL & DIE JOURNAL is published monthly for plant operating and purchasing executives and department heads in 50 types of end product and contract manufacturing companies.
Every copy is directed to such an individual by name, by title, and by company gratis. See CCA certification.
These men, from whom emanate recommendations, requisitions and orders for needed materials, tools, equipment and accessories, comprise the Cycles of Buying Influence within their respective plants—CBI—and it is they who constitute TOOL & DIE JOURNAL'S ever-vital reader circulation.
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NEXT MONTH

"Benefits from Bottlenecks," a tool planning and production operations article resulting from a threatened bottleneck in the milling machine section of an aircraft production machine shop. The problem analysis and solution sparked a revamped methods program which increased machine running time by 50%, and total parts production by better than 25%, thus saving thousands of dollars.

"Hobbing Cavities in Alloy Steels," by John Sekowski, Midland Die & Engraving Co. Creating a die cavity in a body of tool steel by the hobbing process is a case of displacing metal under pressure rather than removing metal by cutting. In this article, Mr. Sekowski covers, in addition to the latest additions to the hobbing steel family, hob design and construction, proper hardening of the hob, and the annealing of the cavity steel. He shows the importance of extreme safety precautions when operating a hobbing press.

"The Use of Inclinable Punch Presses," cont'd., by J. I. Karash, Plant & Process Engineer, Reliance Electric & Engineering Company. In this third installment on inclinable punch press tooling, Mr. Karash treats stripper plate application and construction considerations; stripper plate suspensions, stripper spring action, adjustments, and setup. He explores the practicality of the elevated stationary stripper plate die for relatively small work, and defines its characteristics in terms of safe operation.

"Die Casting Die Design," Part IV, cont'd., by. H. K. Barton and J. L. Erickson. In this continuation of Part IV of the series, the authors get into design and constructional features pertaining to die block thickness, injection chamber sleeves, and injection plungers. They show how the successful filling of the die cavity with the molten metal is dependent upon the layout of the runner pattern.

"Pressworking a Mineral Powder," an article covering the unusual problems (and solutions) encountered when building dies to work a non-flowing dust which reacts virtually as a solid. This called for developing a special, heat treated alloy die steel; using the dies for 8 hours and then letting them "rest" for a week.

New Products

Production Machines, Tools and Accessories. Toolroom Equipment. Measuring Tools and Gages.

New Literature

Catalogs, Pamphlets, Data.

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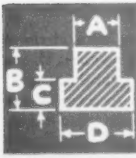

Holes & Thread	A	B	C	D
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CUSTOMER CUT SCRAP LOSSES by 25%

A ¼" thick cam lock of semi-silicon steel was blanked, trimmed and shaved to extremely close tolerances in two separate operations. Lempco-equipped shaving die eliminated 25% of the scrap usually encountered in pressing this part.

Die maker also saved 10 hours in the assembly and try out, due wholly to precision of pre-loaded ball bearing pin bushings of Lempco Die Sets.

DIE MAKER Saves Time in Assembly
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by Using LEMPCO Anti-Friction Die Sets

Here are some comments by users who have standardized on Lempco:

". . . clearances of .002" or under demand Lempco die sets, as few standard die sets will provide that precision without die maker and press operator risking time losses in aligning punches and press stoppages."

". . . press capacity that exceeds 200 strokes a minute requires Lempco die sets, as only specially finished pins and bushings can be used with assurance at higher speeds."

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". . . costly dies and particularly carbide dies, require the protection provided by the precision fit of Lempco die sets."

LEMPCO
ANTI-FRICTION DIE SETS

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REPLACEMENT PLAN
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46-1

A recent analysis, made by one of the largest manufacturers of Office Machine Equipment, using a total of 260 sets of steel gage blocks, indicated that the cost of their gage blocks including a rigid inspection and replacement program amounted to $466,000 during a ten year period.

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Don't be! Use the dresser with the

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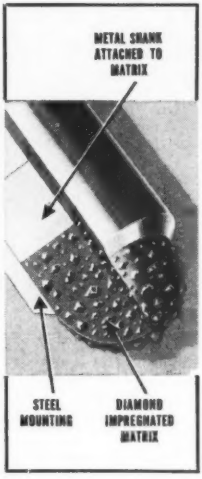

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FIND OUT how you can save up to 40% on dressing costs. Send in the coupon for your free booklet describing Carboloy Wheel-Dressers—today!

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Write for *free* bulletin

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Delta Drill Presses 17" Super-Hi*

Gives you a big saving on initial cost. Provides accuracy, as well as speed and ease of operation, on surface grinding, tool sharpening, etc.

Delta Toolmaker operating advantages include: Convenient controls. Wide micrometer graduations, for close settings. Unique wheel adapter that saves time and redressing. Column that rotates 360°.

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Look for the name of your Delta distributor under "Tools" in the classified section of your telephone directory.

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Bulletin A-14-3 pictures and describes Delta Super-Hi Drill Presses.

Bulletin A-17 pictures and describes Delta 17" Drill Presses.

Bulletin A-23 pictures and describes Delta Toolmaker Surface Grinder, Tool-and-Cutter Grinder, Chip-Breaker Grinder.

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Famous Delta design and construction features give you exceptional value: Extra-long bearing between spindle and sleeve, to eliminate wear and retain original accuracy. Pulley is mounted on lubricated-for-life ball bearings.

Embodying all these features is the Delta Super-Hi Drill Press — a high-speed machine for work from .025" to ¼" diameter.

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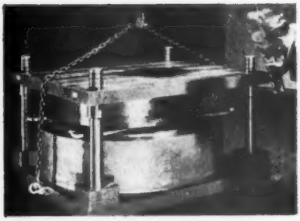
SUPERIOR DIE SETS

Lock-Jaw
WITH LOCKING KEY



YOU set the specifications when you order die-sets from Superior because all Superior die-sets — from ten pounds to ten tons — are *tailor-made* to fit your exact, individual needs. *SUPERIOR* in the truest sense of the word, these die-sets give you all-steel construction, safety flange, lock-jaw lifting and many other Superior features. *Specify SUPERIOR for the very best in die sets!*

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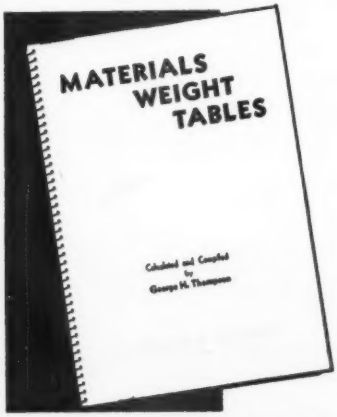

Weights of sheet or bar stock or drill rod easily determined by one computation. "Faster Than a Slide Rule."

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You Can Reduce Operator Time by 90%

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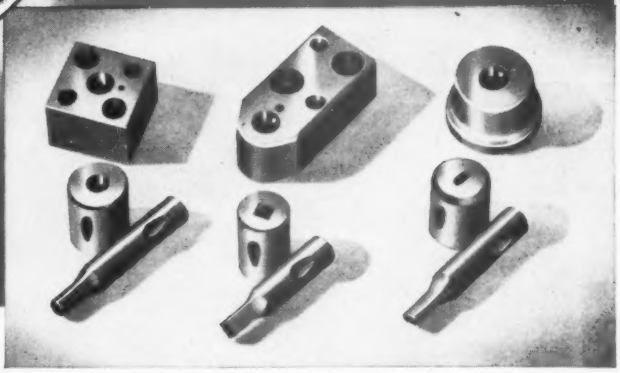

Proved BY YEARS OF USE *in* DIE-BUILDING . . . *in* PRESS OPERATION

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ALLIED PRODUCTS CORPORATION

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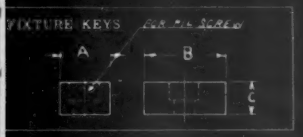

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No.	A	B	C	Fil. Screw	Price Hard	Price Soft
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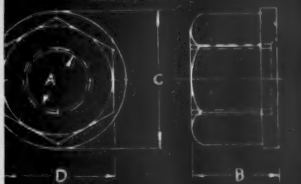
FK-582	5815 5825	1	1/2	1/4	65	60
FK-625	624 625	1	1/2	5/16	70	65
FK-687	6865 6875	1-1/4	1/2	5/16	75	70
FK-750	749 750	1-1/4	1/2	5/16	80	75
FK-812	8115 8125	1-1/4	1/2	5/16	85	80

SPECIFY HARD OR SOFT WHEN ORDERING

FLANGE NUTS

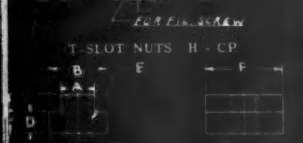


FLANGE NUTS

No.	A	B	C	D	Price
2100	1/4-20	5/16	9/16	7/16	.80
2101	5/16-18	1/2	7/8	11/16	1.00
2102	1/2-13	11/16	1-1/8	7/8	1.20
2103	7/16-14	13/16	1-3/8	1-1/16	1.40
2104	3/4-10	1	1-5/8	1-1/4	1.50
2105	7/8-9	1-1/8	1-3/4	1-7/16	1.75
2106	1" -8	1-1/4	2	1-5/8	2.00
2107	1-1/8	1-3/8	2-1/4	1-13/16	2.25

Machined and milled from the solid - Tapped hole square with flange face

T-SLOT NUTS H - CP



ABBREVIATIONS ON DRAWINGS

HT - Heat Treated H - Hardened
CP - Cadmium Plated G - Ground

KNOB SHOE ASSEMBLIES

No.	A	B	C	D	E	F	Price
KSA-375A	2-1/16	1-1/4	5/8	5/8	3/8-16	1-1/2	1.95
KSA-375B	2-13/16	2	5/8	5/8	3/8-16	1-1/2	2.15
KSA-375C	3-9/16	2-3/4	5/8	5/8	3/8-16	1-1/2	2.35
KSA-500A	2-13/16	1-3/4	7/8	7/8	1/2-13	2-1/2	2.30
KSA-500B	3-9/16	2-1/2	7/8	7/8	1/2-13	2-1/2	2.50
KSA-500C	4-5/16	3-1/4	7/8	7/8	1/2-13	2-1/2	2.70
KSA-625A	2-5/16	2	1	1	5/8-11	2-1/2	2.60
KSA-625B	4-1/16	2-3/4	1	1	5/8-11	2-1/2	2.85
KSA-625C	4-13/16	3-1/2	1	1	5/8-11	2-1/2	3.10
KSA-750A	3-5/16	2	1-1/8	1-1/8	3/4-10	3	2.85
KSA-750B	4-1/16	2-3/4	1-1/8	1-1/8	3/4-10	3	3.10
KSA-750C	4-13/16	3-1/2	1-1/8	1-1/8	3/4-10	3	3.35

Cast Iron Knob - H Steel Stud and Shoe - CP

SPHERICAL WASHERS

No.	A	B	C	D	Price
5900	5/8	9/32	5/16	7/32	.80
5901	1	13/32	7/16	1/4	1.00
5902	1-3/16	17/32	9/16	5/16	1.25
5903	1-3/8	21/32	11/16	5/16	1.50
5904	1-5/8	25/32	13/16	3/8	1.85
5905	1-7/8	15/16	31/32	3/8	2.10
5906	2-1/16	1-1/16	1-1/8	1/2	2.40
5907	2-5/16	1-3/16	1-3/16	1/2	2.90
5908	2-5/8	1-5/16	1-5/16	1/2	3.15
5909	2-7/8	1-9/16	1-9/16	1/2	3.40

WESPO CLAMP ASSEMBLIES

WESPO also manufacturers and stocks a complete line of FIXTURE CLAMPS, including: Automatic Cam, Quick Action Cam, Hand Knob, Swing, Hook, and Midget Clamps. Send for bulletin and full scale template sheets.

QUARTER TURN SCREWS

No.	A	B	C	D	E	Price
6900	10-32	1-7/8	1-1/4	3/4	3/16	50
6901	1/4-20	1-7/8	1-1/4	3/4	1/4	60
6902	5/16-18	2-3/8	1-1/2	1"	5/16	70
6903	3/8-16	2-3/8	1-1/2	1"	3/8	80
6904	1/2-13	2-5/8	1-3/4	1-1/4	1/2	85

MACHINED FROM SOLID BAR

STEP FIXTURE KEYS H-G

No.	A	B	C	D	E	F	Fil. Screw	Price
SFK-500	499 500	624 625	1/2	3/16	624 625	5/16	1/4	1.50
SFK-625	624 625	749 750	1/2	3/16	749 750	3/8	5/16	1.50
SFK-6875	6875 6885	8115 8125	1/2	3/16	8115 8125	13/32	5/16	2.00

T-SLOT NUTS

No.	A	B	C	D	E	F	Price
TSN-375	17/32	7/8	5/8	5/16	3/8-16	1-1/4	.50
TSN-500	21/32	1-1/8	3/4	13/32	1/2-13	1-1/2	.55
TSN-625	25/32	1-5/16	7/8	17/32	5/8-11	1-3/4	.65
TSN-750	1-1/32	1-11/16	1-1/8	11/16	3/4-10	2-1/4	.75

ORDER BY PART NO.

IMMEDIATE DELIVERY

All parts shipped f.o.b. Detroit

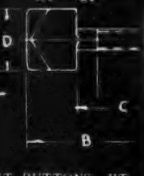
SPHERICAL WASHERS H - G

"C" WASHERS H - G

"C" WASHERS

No.	A	B	C
6800	1-1/4	13/32	3/8
6801	1-7/8	17/32	3/8
6802	2-1/8	21/32	3/8
6803	2-1/2	25/32	7/16
6804	2-1/8	29/32	7/16
6805	2-1/2	1-1/32	7/16

QUARTER TURN SCREW HT - CP



REST BUTTONS HT

REST BUTTONS

No.	A	B	C	D	E
7000	.376	5/8	1-1/8	5/8	1
7001	.503	7/8	1-1/8	5/8	1
7002	.628	1	1-1/2	7/8	1
7003	.751	1-1/4	1-1/2	7/8	1

SHANK G. AFTER PLATING

ORDERS FILLED PROMPTLY

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OVER 250 PARTS

WEST POINT MANUFACTURING CO

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FARMINGTON, MICHIGAN

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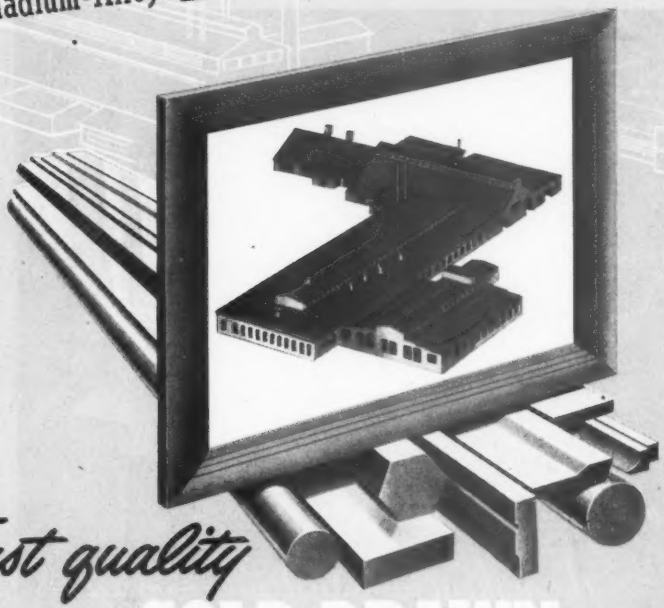
Vanadium-Alloys TOOL STEEL specialization



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COLD DRAWN TOOL STEELS

produced by our **Anchor Drawn Steel Division**—
for toolmakers everywhere . . .

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Gold Anchor	Red Anchor
Vasco M-2	Blue Anchor
Vasco Supreme	Non-Shrinkable
Van-Lom	Colonial No. 6
8-N-2	Carbon-Vanadium
E. V. M.	Chrome-Vanadium
Red Cut Cobalt	Red Star Tungsten
Neatro	Hotform

Standard Shapes
Squares · Flats · Hexagons · Octagons

Special Shapes
See our Bulletins for typical examples

Anchor Drawn Steel Company's job in the Vanadium-Alloys family is the cold finishing (drawing, grinding, etc.) of the High Speed, Alloy, Carbon and Special analysis Tool Steels produced by our Vanadium and Colonial Steel Divisions. You may be sure that Anchor's many years of concentration upon *perfection in production* guards our steel quality in every grade, in every cold drawn size and shape that saves you money . . . that delivers better *performance* at the working point. Our representatives will help you select the proper cold finished steel for your job or help you work out special shapes to save you machining costs.

Manufacturers of
FIRST QUALITY
TOOL and DIE STEELS
—exclusively

Vanadium-Alloys
STEEL COMPANY
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Representation throughout Industrial America

Micro-metric jig-bored die sets in commercial or precision grades are available to you through the DETROIT DIE SET representative in your community. Phone or write for prompt delivery of standard and special die sets and high-precision die maker's supplies.

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MINNEAPOLIS	AT 5264
PHILADELPHIA	VI 4-4084
PITTSBURGH	GR 1362
ROCK ISLAND, ILL.	RI 743
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Milling Cutter Blades

ALL TYPES... Carbide Tipped, Cast Alloy, High Speed Steel, ...Plain, Serrated, Helical

AT SAVINGS... Lowest Prices, Highest Quality, Prompt Delivery, Many Types in Stock

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This book is intended to help you properly select cutters for your work. It includes illustrations, detail drawings, specification tables, grinding charts, how to order and other useful data.

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This book shows through illustrations and diagrams the wide range of application of the Ingersoll cutter grinder and contains helpful information for the operator.

THE INGERSOLL MILLING MACHINE CO.
ROCKFORD, ILLINOIS

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Cutter Catalog 56H ☐ Cutter Grinder Catalog 57H ☐

Firm _____

Address _____

City _____ State _____

Name _____ Title _____

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

With Two DI-ACRO BENDERS

A difficult production problem of forming two bends in a long length of tubing was solved by "teaming up" two DI-ACRO Benders as illustrated. This dual-forming arrangement saved installation of special machinery. Two accurately formed bends are obtained in one operation—without distortion of the tube and at a cost competitive to power operated equipment. More than 300 pieces are completed per hour—600 individual bends.

"DIE-LESS DUPLICATING" Often Does it Quicker WITHOUT DIES

This is but one example of how DI-ACRO precision machines —Benders, Brakes and Shears—can accurately and economically duplicate a great variety of parts, pieces and shapes, without die expense. Write for catalog—"DIE-LESS DUPLICATING".

◀DI-ACRO is pronounced "DIE-ACK-RO".

DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING

O'NEIL-IRWIN MFG. CO.

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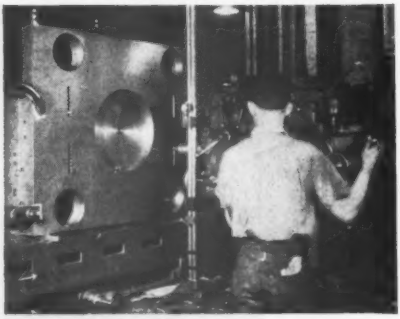
A PRODUCTO DIE SET

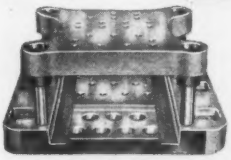
GIVES YOU EXACTLY WHAT WE PUT INTO IT... *Precision!*

The background of a Producto Die Set is composed of "Know How," highly developed machine equipment, and skilled craftsmen.

Every set is precision made throughout... with the extreme accuracy that insures correct alignment of guide pins and parallelism of punch and die holder. Our careful machining, like the horizontal boring operation shown at right, increases die life... minimizes scrap... insures production of quality parts.



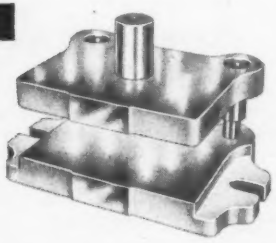
Special DIE SETS



When you give us your specifications for a Producto Special Die Set we consider it an order to be obeyed to the most minute detail. Our special equipment permits production of any type of set from midget size to those weighing several tons... all precisely machined and perfectly finished in every respect. Special folder or catalog on request.

Catalog DIE SETS

Both Master and Standard Sets are immediately available from assembly plants in seven major stamping centers and also from strategically located stocks throughout the country. Hundreds of sizes in many styles cover your requirements for use with all standard punch presses. Call our nearest representative for complete details ... or write for Catalog.



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BIRMINGHAM 54-9521
BUFFALO MOhawk 1110
CAMDEN, N. J. 4-7765
CHICAGO ESterbrook 8-3307
CINCINNATI MAin 2794
CLEVELAND Superior 6159
DALLAS C-5186
DETROIT Walnut 1-3101
ELMIRA 5168
ERIE 5-4375
GREENSBURO, N. C. 7-8668
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LOS ANGELES Trinity 9826
MIAMI 3-2384
MONTREAL MA 5346
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PHILADELPHIA Lombard 3-4480
PITTSBURGH Atlantic 4116
ROCHESTER Main 5749
ST. LOUIS Jefferson 4805
SAN FRANCISCO Exbrook 2-7230
SYRACUSE 3-1181
TORONTO Hudson 9071
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To extend die set assembly service in the Philadelphia area, Producto announces the opening of a new plant at Camden, N. J.

THE PRODUCTO MACHINE COMPANY

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Bridgeport 1, Connecticut • Tel. 4-9481

Near Neighbor SERVICE

APD-49

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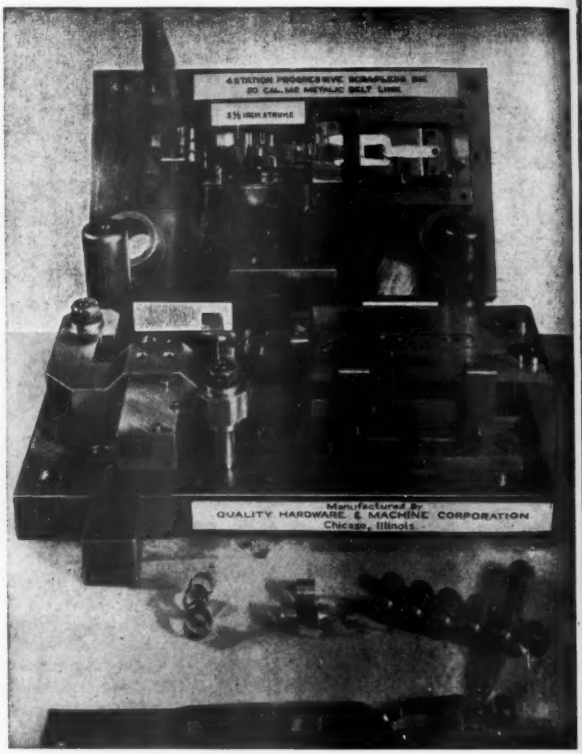
INCREASED PRODUCTION . . . LOWER COSTS

with

PLANNED TOOLING



QUALITY . . .

has done it for many others, and can do it for you.

Permanent Tools for high production
Quick Process Tools for short runs

Complete tooling, engineered, built and assembled for your presses, with Automatic Feeds, and thoroughly tried out, ready to set up in your plant for economical production

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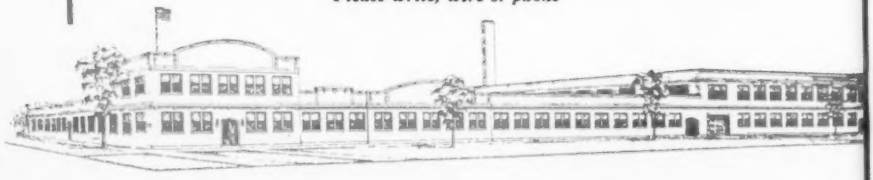

QUALITY HARDWARE AND MACHINE DIV.

CONTINENTAL COPPER & STEEL INDUSTRIES, INC.

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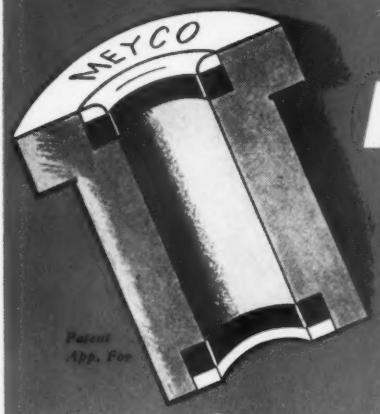

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Pump Maker: "We have a jig setup where four holes are held to a limit of plus or minus .0005" on the spacing. MEYCO bushings were put into service . . . and, in five months, after completing 50,000 parts, the bushings show no appreciable wear."

Motor Maker: "The MEYCO bushings . . . have been working very satisfactorily. Our cost reduction report . . . shows the MEYCO equal to 12 former steel bushings. Total savings for this one project equals $230.00 per year."

Meyco Carbide Inserted Drill Jig Bushings

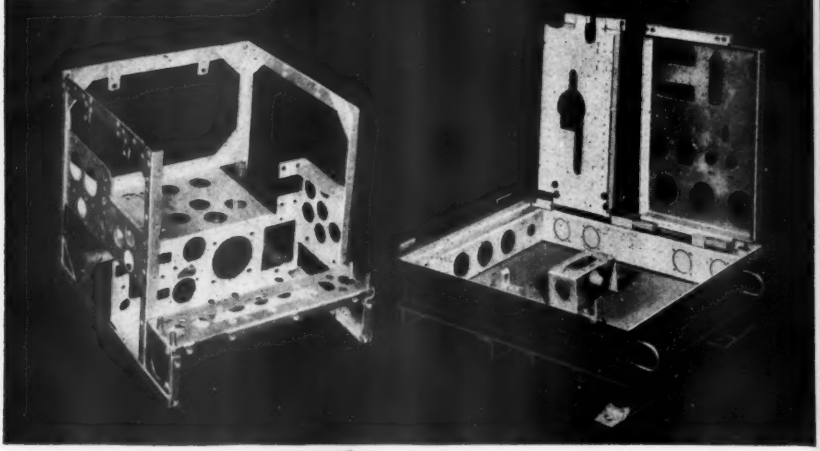
MEYCO bushings combine the best features of steel and carbide . . . the protection of steel with the long life of carbide at the points of wear. First cost: higher; end result: substantial savings in production expense. Made to ASA standards . . . MEYCO bushings will SAVE you money. Don't miss *this* bet! Some sizes now available from stock.

Write for bushing catalog No. 17, for further details and a price list.

W. F. MEYERS CO., INC., BEDFORD, INDIANA

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

WHISTLER ADJUSTABLE DIES... USED BY OVER 1000 MANUFACTURERS



SIMPLIFYING COMPLICATED PIERCING OPERATIONS...

HU-50 Perforating unit used in conjunction with standard Whistler Adjustable Dies on the same job.

LEADING manufacturers find it fast, simple, accurate, and economical to use Whistler Adjustable Dies for the tough jobs. Complicated patterns can be set up quickly. It's easy to change hole arrangements too . . . without waiting and at no extra die cost. New HU-50 units, that pierce at 90° angle, can be used in conjunction with standard perforating equipment. Fewer press operations are necessary.

Savings, through continued re-use of the same dies in different arrangements on many jobs, are most important.

Whistler Adjustable Dies can be used in practically every type press. Standard sizes of punches and dies up to 3" are available in a hurry. Only a few days are necessary to get special shapes made to order.

S. B. WHISTLER & SONS, INC.
748 Military Road Buffalo 17, N. Y.

For more details **on this modern way to speed production and save money, write for your copy of the Whistler catalog.**

SEND *NOW* FOR FREE FOLDER ABOUT THE

Milmaster

MILLING ATTACHMENT PAYS FOR ITSELF IN A FEW JOBS

WHEN YOU CUT COSTS today you're doing something! And you can certainly cut costs with the Milmaster. It reduces the number of set-ups...boosts machine output... does an efficient job in nearly any position. Milmaster is no gadget—it's a strong, accurate, precision-built piece of equipment for severest service conditions. Many attachments available. Send coupon today.

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REDUCE COSTS · MAIL TODAY · BOOST PROFITS

Bemis & Call Company
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Send me free folder describing the Milmaster "that converts one machine into a tool shop."

Company_____

Your Name_____

Address_____

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Job File No. 1949

MALLEABLE NUT PRODUCTION

Fully Automatic

CONTROLLED BY T-J CYLINDERS

All moving parts are controlled hydraulically by T-J Cylinders —on this Malleable Nut Production Machine designed and built by Roy Hays & Associates, Rockford, Ill., for the Wagner Malleable Products Co., Decatur, Ill.

It's *fully automatic*—the operator only places nuts in stations. Nine T-J Cylinders, 40 ton to ½ ton, help complete the job of cutting off sprue, sizing, boring, facing, chamfering and threading 2,500-¾ std. pipe thread nuts per hour.

For your tough jobs of power movement —pushing, pulling or lifting—*save labor, speed production* and *cut costs* with T-J Air and Hydraulic Cylinders! Many standard sizes and styles . . . both cushioned and non-cushioned types . . . 100 lb. or 50,000 lb. Precision-built for long-life dependability. Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Michigan.

FOR POWER MOVEMENT IN ANY DIRECTION

100 LB. or 50,000 LB.

32 YEARS EXPERIENCE

T-J

TOMKINS-JOHNSON

VALVES · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CYLINDERS

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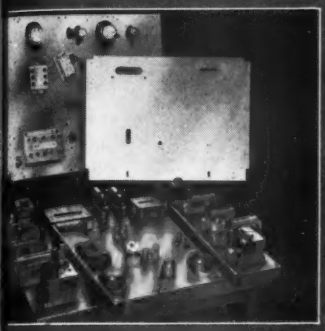
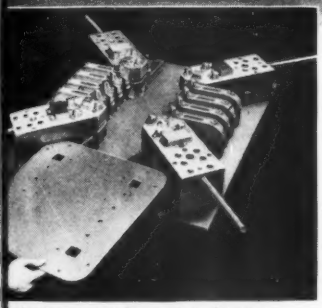
A WORD ABOUT

WALES

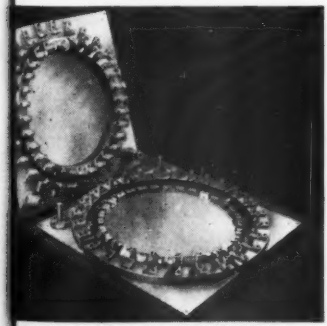
SERVICE ENGINEERS WHO CALL ON YOU



...up of Wales Equipment, made for a large ...ne manufacturer.



...s Equipment set up for an air conditioning ...nt manufacturer. Note holes and rounded ...ers in the work in foreground.



...up of Wales Type "CD" Hole Punching ... for a jet engine manufacturer.

● Wales-Strippit Service Engineers are specialists in hole punching and notching,—selling no other line of equipment. Many of these Service Engineers have had several years' experience in the Engineering and Production Departments at the Wales-Strippit plant. They know from experience what Wales Equipment will do for you. These Service Engineers are as valuable to you as the Wales Equipment. Illustrations of Setups at left are typical suggestions made by Wales Service Engineers. Call them in for suggestions.

AS A FURTHER SUGGESTION

Before deciding on the hole punching and notching portion of your tooling program, check with Wales-Strippit engineers who may solve your particular hole punching problems by using STANDARD adaptations of STANDARD Wales Equipment. Join the large group of leading manufacturers who have made it a rule to call on Wales-Strippit before putting holes in angles, channels, extrusions and sheets by *any* method.

WALES-STRIPPIT CORPORATION

GEORGE F. WALES, *President*

355 PAYNE AVENUE, NORTH TONAWANDA, N. Y.

(Between Buffalo and Niagara Falls)

WALES-STRIPPIT OF CANADA, LTD., HAMILTON, ONTARIO

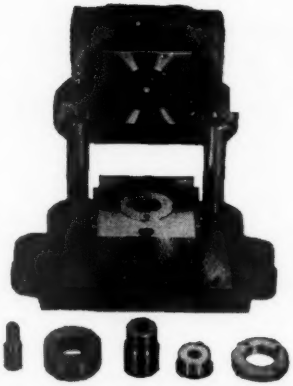
Specialists in Punching and Notching Equipment

Do WASHER PROBLEMS worry you?

LEAVE YOUR TROUBLES TO US!

HOVIS
UNIVERSAL MASTER
WASHER DIES

DON'T let special washer problems get you down. We can solve them easily. Simply tell us the size of washer you want to make and we will furnish the "tools". The Hovis Universal Washer Dies provide a Master Holder and Small Blanks for making washers. No need to make a complete new die for each new size and type of washer or blanks. After you purchase a Hovis Master Die, you merely change 5 SMALL, EASILY REMOVABLE PARTS to make a new size blank required. It takes only a few minutes. It's quick, simple and economical. Leading manufacturers have adopted the Hovis method. Get details. Write for literature today.



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¾"—1½"—2½"
4"—6"

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Suburb of Detroit

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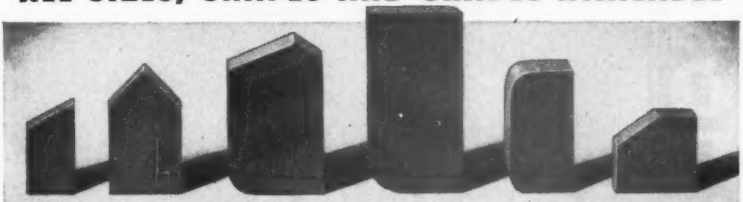
FOR CUTTING TOOLS

ALL SIZES, SHAPES AND GRADES AVAILABLE



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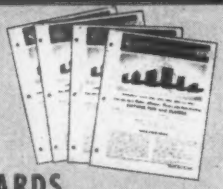

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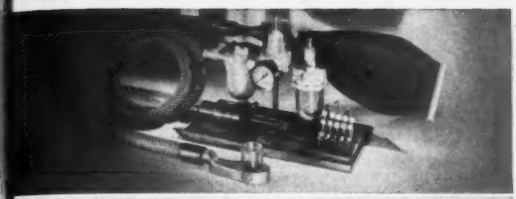

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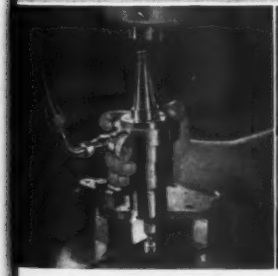

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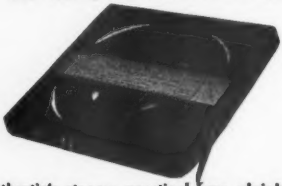

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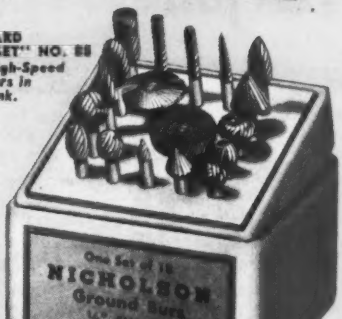

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HAND CUT AND MACHINE GROUND • HIGH-SPEED STEEL AND CARBIDE

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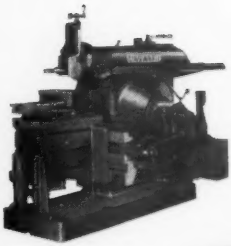

Internal shaping bearing seats in this 5500-lb. steel plate to a tolerance of .001 indicates the accuracy and rigidity of Cincinnati Shapers.

The rapid and accurate metal removal, and the low-cost setup for shaping this 12' steel plate on the sturdy Cincinnati table, give low-cost operation.

The unusual flexibility of change from job to job in minimum time and with minimum costs of tooling and fixtures also has made the Cincinnati Shaper the handy man of industry.

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It removes metal *faster* — taking deep cuts without burning. That's because the greater purity of "32" gives the grains greater point endurance—they stay sharp longer And the nubbly surface of the grains gives more room between points—greater chip clearance.

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If you haven't tried 32 ALUNDUM wheels for your surface and tool grinding jobs, you may be missing a real chance to cut grinding costs.

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It's produced differently by a Norton-invented and Norton-patented process. Each grain of 32 ALUNDUM abrasive is formed in the electric furnace as a single complete crystal. Each crystal is formed with many sharp points on all sides, no matter how they are bonded into a wheel one or more cutting points are exposed for faster, cooler cutting. Each grain is over 99% pure fused alumina—more usable abrasive for greater resistance to dulling.

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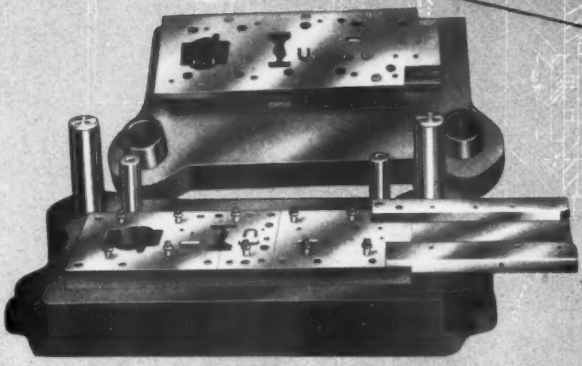
HARIG LAMINATION DIES



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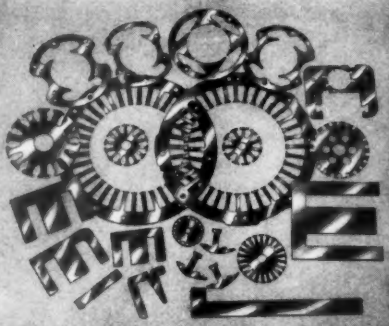

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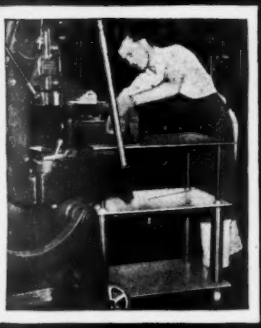

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tooling and production ingenuity

It is now an accepted fact that the buyer of manufactured goods is out for lower prices. Lower costs make such reductions possible. A part or product cost comes down as the result of lesser costs of materials or of tooling or of production or of sales and management. Let each contribute its fair part and the result can be ideal, a fine example of cooperative effort. But currently the team is not playing that "brand of ball".

However, there is a potent, powerful substitute for this ideal cooperative effort and in our America it has paid off many, many times. It is *ingenuity*. To have it, is to possess "cleverness in contriving or originating"; to have "skill in devising or combining". "It is shown in devising expedients, overcoming difficulties, inventing appliances, adapting means to ends".

Two dictionaries contributed this definition of *industrial ingenuity*—the ingenuity which can again design cost-reducing tools, build cost-reducing machines and accessories, plan and devise cost-reducing production and assembly.

Many times we have expressed these same ideas in other words, and we expect to do so in the future, consistently and insistently!

Just so long as we can walk through a plant and see an old "beat up" machine being driven from line-shafting; a fixture that requires two men and a boy for loading and unloading; a press operating without adequate safety devices; a boring tool chattering in protest; five 2-hp machines being run by five men instead of one 10-hp machine "push-buttoned" by one man; a component built up from two or more pieces when it could be "socked out" of sheet stock by one press stroke; i. e., just so long as we can see the need for new tooling and retooling we shall emphasize the need for new tooling and retooling.

Our editorial pages are devoted to showing you how others, some of whom may be your competitors, are employing tooling ingenuity to increase productivity and reduce costs.

When we present such an article as last month's "Punching 1045 Hot Rolled Steel Tractor Draw Bars", we know that for every reader concerned with punching tractor draw bars there are hundreds concerned with punching 1045 hot rolled steel in other production programs.

We know that what Herbert Harig had to say, in the same issue, about lamination die cost and performance will cause both producers and users of laminations to think twice about tool life and economy. Should they be satisfied with less than he is experiencing?

The ingenious broach tooling described in our May issue need not be limited to jet engine rotors. It is directly applicable to other peripheral slotting jobs in workpieces equally tough to machine.

The multi-station progressive die designs by Hans Effgen are, first of all, examples of tooling ingenuity applied to electrical terminal clips. Further, however, they stimulate ingenuity in product and tooling design and redesign in order that other end products may benefit from the high productivity and low piece-part cost characteristic of progressive dies.

A prime ingredient of tooling ingenuity is courage. Courage to discard the old way of doing in order to initiate the new. Courage to be dissatisfied. Courage to recognize the obsolete. Courage to buy, in order to sell. Courage to beat competition, not just to meet it.

Tooling and production ingenuity is posted in black ink; the lack of tooling and production ingenuity is recorded in red ink.

E. Willard Pennington

editor

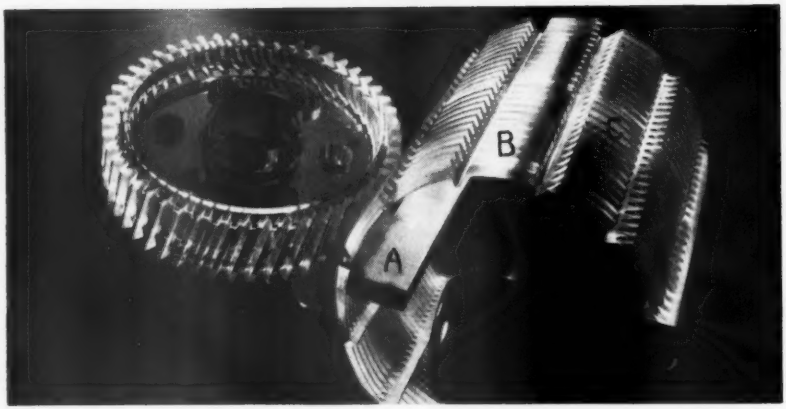


Fig. 1. A transparent plastics model showing the relationship that exists between the master worm section and a gear cutting hob. Phantom section (A), imagined to have been ground concentric with the hob axis, has no relief. The other sections, (B) and (C), are backed off.

A New Concept of Gear Inspection

It is usually conceded by those versed in the gear art that the best way to check gears is to duplicate as nearly as possible their operating conditions. This is usually done by running the gear to be checked in intimate contact with a master of known accuracy on a variable center distance fixture, and measuring the radial displacement caused by the inaccuracies on a suitable indicator. This master may be another gear or pinion or a conjugate member. The conjugate member may be the parent rack or a helicoid.

To meet all the demands of quality control a gage must be as accurate as possible. A gage of limited accuracy robs the manufacturing department of that part of the tolerance which is absorbed by the gage. The nearer perfection is approached in a gage the more valuable and economical it becomes. If increased accuracy can be achieved at no increase in cost it becomes doubly valuable. If, furthermore, a gage can be devised to serve more than one function and at the same time have a high order of perfection, a definite contribution to economical quality control is achieved.

The Conju-Gage is based on a fundamental mathematical principle well known in the gear art but not heretofore exploited. It employs the conjugate helicoid of any one of several gear systems. The checking element is actually a section of a worm and is manufactured by placing a number of individual sections in a drum and grinding a worm of the correct profile. When the individual sections are removed from the drum in which they were ground their appearance is that of a rack because the teeth appear to have straight sides. Actually the sections are conjugate to, but not identical with, a rack. Each individual section is, in fact, a section of a single-toothed helical gear which is conjugate to the basic rack of one of several gear systems. This may be involute, cycloidal, or any other gear system.

by Louis D. Martin
Gear Engineer, Camera Works
Eastman Kodak Company

Figure 1 shows the relationship that exists between the master worm section and a gear cutting hob. It is well known that a hob of a given normal diametral pitch and pressure angle will generate gears of similar normal pitch and pressure angle regardless of helix angle. Phantom section (a), Figure 1, is a master worm section imagined to have been ground concentric with the hob axis. The only difference between section (a) and other sections, such as (b) and (c), is that it has no relief while the other sections, or hob flutes, are backed off to provide the necessary cutting clearances.

If instead of rotating a hob, we impart axial movement to it, the action will be that of the master worm section in the Conju-Gage. In setting up a hob to cut a spur gear, the hob spindle is usually set off the perpendicular position by an amount equal to the lead angle of the hob. This angular setting affects only the tooth thickness and height of fillet of the gear produced. It has no effect on conjugate action of the hob. Advantage is often taken of this feature in hobbing gears to produce a desired amount of backlash. In this respect the characteristics of the master worm section and the hob are similar.*

It is well known that a hob of a given normal pitch and pressure angle will cut both spur and helical gears and can be used for an infinite number of helix angles of either right or left hand. The same is true of the master worm section when used as an inspection tool. *One section will check spur or helical gears of either hand of the same NORMAL pitch and pressure angle.* Figure 2 shows a representative master worm section as used in the 4-U Conju-Gage.

The chief limitation is one of size, since it is desirable to make the section equal in length to the circumference of the gear to be checked. Another limitation which has been found to be of minor importance is restricted area of contact with the gear to be checked. (It is not claimed that a check of tooth bearing can be obtained with the master worm section, since this can be determined accurately only when the gear is running with its mate under load.)

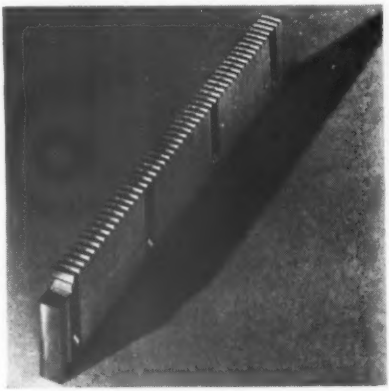


Fig. 2 (above). A representative master worm section as prepared for use in the 4-U Conju-Gage. It is a section of a single-toothed helical gear. The datum surface, on near end, establishes nominal pitch line.

Fig. 3 (below). Model 1-S, the smallest of the Conju-Gages, is intended primarily for checking all types of spur gears commonly used in the meter, instrument and watch industries. With special fixtures, helical gears can also be checked.

*Buckingham, SPUR GEARS, Chapter 10. (Industrial Press).

H. E. Merrit, GEARS, Chapter 7, paragraphs 7, 8. (Pitman, London, 1942).

Gould & Eberhardt, THE HOBBING METHOD OF CUTTING GEARS, p. 4-5. (Gould & Eberhardt 1940).

The stability and freedom from distortion of master worm sections have been well demonstrated in extended use. The structural design of the section, the material, and its heat treatment have been chosen to achieve this.

The advantages of the master worm section are as follows:

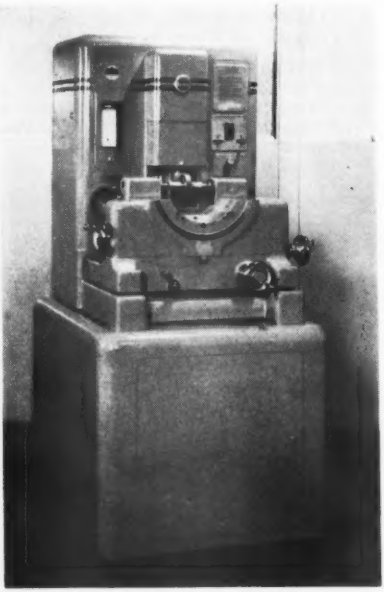
1. It is more economical than circular master gears because

(*a*) *it has greater versatility, since one worm section of a given normal pitch and pressure angle can check spur or helical gears of any helix angle as long as they have the same normal pitch and pressure angle.*

(*b*) *it can be reground any number of times at a fraction of its original cost.*

(*c*) *one master worm section will check gears with different amounts of backlash thus replacing a number of master gears having different proportions.*

Fig. 4. The 4-U Conju-Gage incorporates features which increase the ease and rapidity of inspecting larger gears up to 4⅛" pitch diameter.



2. It is more accurate than circular master gears. The master worm section is produced as a helicoid on precision thread grinding equipment. It is in fact a section of a single-toothed helical gear and because of its method of production it can be made to a much higher degree of accuracy than circular master gears.

3. It has an attached datum surface which establishes its nominal pitch line when it is used to measure backlash.

4. It is common practice, when using master gears, to increase the tooth thickness of the master by the amount of backlash desired in the gear it checks. The tooth thickness is increased to avoid interference and prevent the master gear from bottoming in the production gear. This practice requires the use of special master gears for specific jobs. The master worm section does not require special tooth proportions when checking gears of various amounts of backlash, because the nominal tooth thickness of the worm section can be increased by the simple expedient of changing its lead angle setting.

5. No special center distance corrections or calculations are required when non-standard gears are checked on the Conju-Gage. When circular master gears are used to check non-standard gears a mathematical correction must be made. In the Conju-Gage this correction is not necessary because the operating pressure angle remains constant with the master worm section irrespective of center distance. When circular masters are used to check over- or under-sized gears the operating pressure angle differs from the standard pressure angle. The difference depends on the amount by which the gears and masters are over or under their standard diameters.

6. Regrinding does not affect size, since the datum point is adjusted to the new size. Master gears cannot readily be reground.

7. Master worm sections can be made in much finer pitches than circular master gears and with any tooth form.

8. It is possible, in the present stage of development of the art of thread grinding, to make master worm sections of tungsten carbide if desired. Tungsten carbide master gears are not practical.

9. Because of the fact that the master

worm section is part of a helicoid it has curvature in the transverse plane. This curvature is dependent on the size of the drum in which the sections are ground. The curvature can be used to advantage in probing the gear being checked for such conditions as taper, position and amount of crown. Such a check cannot be made with conventional circular master gears.

10. The master worm section can be readily checked with generally available equipment.

Control of three primary errors is important in the master worm section. Most important is profile error. Since the shape of the tooth of an involute worm section in a normal plane is a straight line, the normal pressure angle can be checked by means of a sine bar and suitable indicator on a surface plate.

The second item of importance is parallelism between the pitch line and mounting surface of the worm section. This can be checked by indicating over a precision gear measuring wire placed in successive tooth spaces. The difference in indicator reading from one end of the master worm section to the other corresponds to runout in a master gear.

Lead error, the third point that must be controlled in a worm section, has the same influence as a combined circular pitch and tooth thickness error in a circular master gear, but with this essential difference: the cumulative lead error in the master worm section can be appreciable and still not affect its accuracy as a gaging element. This is because the lead error is only manifested through the actual length of the arc of action of the gear and master worm at any instant. This arc of action is usually very small, seldom exceeding three base pitches and it comprises a minute amount of the total lead error. With the high order of accuracy currently obtainable in precision lead screws, the possibility that lead error can affect the accuracy of the master worm sections is very remote. This is in contrast to the limitations of circular master gears which depend on an index plate for spacing. Here one often finds sudden and unpredictable tooth thickness and circular pitch errors many times greater than the incremental lead

Fig. 5. The Composite Backlash Checker, designed to supplement Conju-Gage equipment, enables a gear cutting machine operator to quickly detect size change.

error of the master section. Thus the master worm section is more easily checked and can be held to far closer limits than is possible with a master gear in which the bore, the fit between the bore and a stud, and a pitch line must all be taken into account.

These highlights indicate some of the advantages of the master worm section used in connection with the Conju-Gage. A complete line of instruments embodying the advantages of the master worm section has been developed. By means of these instruments it is possible to cover the range from the tiniest wrist watch pinion to gears of 8¼" diameter. In the whole Conju-Gage series three fundamental requirements were set up as objectives: sensitivity, repeatability, and permanence of adjustment. It is felt that these objectives have been attained in a group of ruggedly constructed gear checking instruments that are simple to operate.

The 1-S Conju-Gage, Figure 3, is the smallest of the Conju-Gages. It is intended primarily for checking all types of spur gears commonly used in the meter, instrument, and watch industries. By using special fixtures, helical gears within the capacity of the 1-S Conju-Gage can also be checked.

As shown in Figure 3, it consists of a

(CONTINUED ON PAGE 67)

The Use Of Inclinable Punch Presses

(continued)

The Inclined Press

Shown in Figure 5 is a typical example of an inclinable press. This machine can be tilted to angles within the limits of the visible adjustment slot. It is not common shop practice to change the press tilt angle. Whatever angle the machine happens to be set at originally usually remains for the life of the machine. It is common to see inclinable presses set up in a vertical adjustment position, completely ignoring the potential advantages of the inclined press.

by J. I. Karash
Plant and Process Engineer
Reliance Electric & Engineering Company
Cleveland, Ohio

Shown in Figure 6 is an example of a permanently inclined press. The angle of this machine can not be changed. On procuring such equipment, one should be very sure that the angle of tilt is suitable to the particular needs.

Generally, permanently inclined presses are built to about a 30 degree angle. This has not been sufficient angle in the experience of the author. Forty-five degree tilt has been much more practical for general use.

Basic Types of Materials

In the operation of a press, there are two basic types of materials utilized:

A—Unit Stock (Figure 7)

B—Strip Stock (Figure 8)

Ordinarily, the greatest hazards are incurred when using unit stock, because this represents individual pieces that must be placed into the danger area and removed after the stroke of the press.

Strip stock, on the other hand, has certain inherent safe features. The material, itself, serves as its own handle going into the danger area and the scrap web becomes a handle in coming out of the press. Thus the operator can maintain his hold on either the ingoing or outgoing material without placing his hands in the danger area.

Types of Press Operations

In the operation of a press, there are two basic types of operations:

A—Single Stroke

B—Repeat Stroke

Single stroke operations must be utilized under any circumstances or conditions which make it necessary for the operator to reach into the danger area. There must be a definite pause between strokes, in order for an operator to note the position of his hands and the location of the material in the press before tripping the ram. The disadvantage of single stroke operation is that it is slow; the

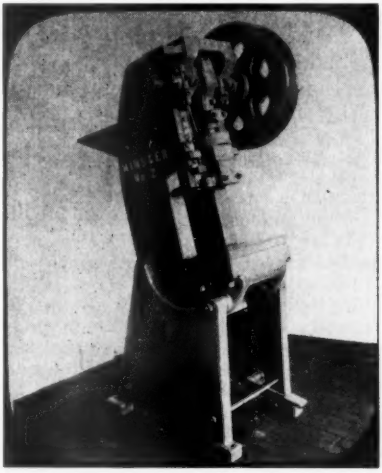


Fig. 5. An inclinable punch press. Note knock-out bar projecting through slot in ram.

Fig. 6. The permanently inclined press has no adjustment for degree of inclination.

slowness being necessary for a *degree* of safety.

Repeat stroke can be utilized only in those instances where a die is completely safe in every respect, i. e., that there is no necessity for the operator to reach into the danger area, and that suitable guard screens are provided to prevent inadvertent entry. Obviously, repeat stroke would be a hazardous condition if the operator had to reach into the danger area to place or remove material.

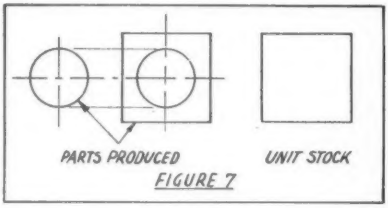
Die Design for Inclinable Presses

One of the basic points of difference between the conventional die for upright presses and the inclined press die, is the specific use made of the knock-out bar and knock-out pins in the inclined press. Shown in Figure 5 is an illustration of a bump-type knock-out bar and knock-out pin arrangement. The knock-out bar is a floating member of the ram of the press. It ordinarily is mounted through a slot in the ram, the ram riding up and down with the knock-out bar. The knock-out pins (stripper pins) ride on the die stripper plate. As the ram nears the top of the up stroke, the knock-out pins engage, or meet, the knock-out bar. As the ram travels the last increment of its upward movement, the knock-out bar depresses the knock-out pins and the stripper plate and thus causes stripping of the material from the upper die member.

Very particular note should be made of the fact that this stripping takes place at the top of the ram stroke. The significance and importance of this fact will be clarified in the die design discussions which follow.

In Figure 5 we show a single knock-out bar for the purpose of simplicity of explanation. Actually, a press can have more than one knock-out bar, as is illustrated in Figure 11. In the example of Figure 5, the knock-out bar happens to have a side to side back arrange-

Fig. 7. An example of (square) unit stock as fed into a press for piercing, one at a time.



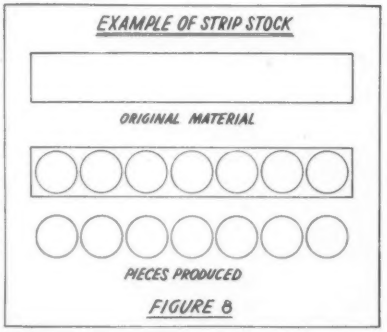


Fig. 8. Strip stock as prepared for feeding into a press for a succession of repetitive operations.

ment. Other presses, particularly the straight-side-type press, have a front to back knock-out bar position (See Figure 9).

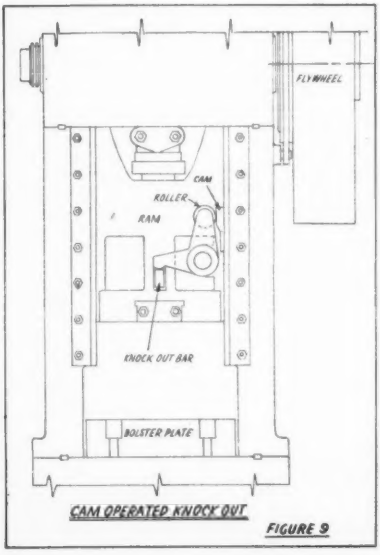
There are various constructions of knock-out bar mechanisms. For example, shown in Figure 9 is an example of a cam-operated knock-out bar. This arrangement has several advantages. The knock-out action can be set to take place in any part of the stroke; that is, at the top of the stroke or at any desired part of the rise. In some instances, it is desirable to strip the material before the top of the ram stroke, so as to get a greater time factor for the automatic removal of material. This condition is particularly true in the case of relatively high speed operation.

The cam-operated knock-out bar has a further advantage in that its stripping action is gentle. It will be noted that the roller of the cam arm climbs an inclined plane to cause the stripping action. If the angle of the plane is made very shallow, a smooth stripping can be achieved rather than a sharp impact.

In instances (particularly where a large number of punches are used) where considerable stripping force is required, the piece, on stripping, leaves the punches with a very sharp snap movement and may tend to fly back into the die. By using a tapered cam-operated stripping motion, a smoother stripping action can be effected. The material is then essentially pried off, rather than knocked off, the punches.

In designing a die, the designer is limited as to the positions where he can place his knock-out pins. The knock-out pins must pass through holes that are in the ram. The designer is limited to using these holes and not merely placing the knock-out pins where he would like to have them. It is, therefore, of utmost importance for the designer to establish, as he progresses and procures equipment, a standardization of knock-out pin location.

Fig. 9. The cam and roller arrangement for operating a knock-out of the single bar type. Cam angle governs abruptness of knock-out action.



For example, if all of the presses in a plant had different knock-out pin arrangements or spacings, this would tremendously handicap the universal use of dies with regard to the various presses. The dies would then only be usable in machines having suitable knock-out pin arrangements. However, if a designer keeps this in mind and sees to it that presses are procured with a standardization of knock-out location, he can approach 100 per cent standardization and universal use of dies between presses.

Shown in Figure 10 is an example of an offset knock-out pin arrangement. Very frequently this, or similar means, must be employed to provide the desired stripping action at a point that does not coincide with any knock-out pin position.

Multiple Bar Exposed Knock-Out

Shown in Figure 11 is a multiple bar cam-operated knock-out. The very unusual feature of this particular arrangement is that the knock-out bars are in exposed slots on the ram face. Thus, instead of a very limited number of knock-out pin positions, knock-out pins can be placed in the die at any point along the knock-out bars. Die designers who have

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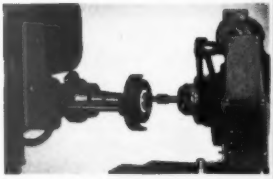
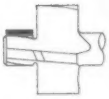
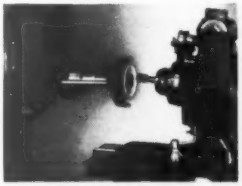
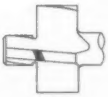




Cylindrical grinding the pilot diameter of a counterbore. Here the motor drive to the workhead is utilized.





Here the workhead spindle housing has been tilted vertically to grind the clearance angle of counterbore, using side of disc wheel.

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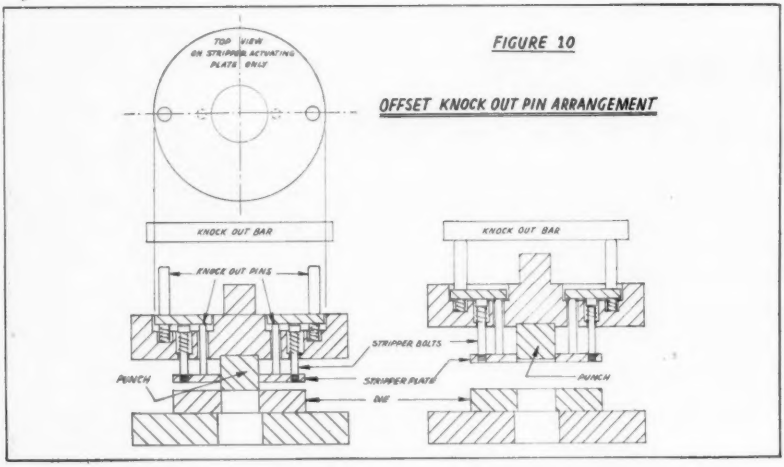

Fig. 10. Offset constructions are used where it is necessary to provide stripping action at points which do not coincide with knock-out pin positions.

wrestled with difficult knock-out pin spacing problems can readily grasp the beautiful simplicity and flexibility of this mechanism.

The multiple bar knock-out also has considerable practical advantage over the single knock-out bar, in that the stripping action can be applied simultaneously to various points on the stripper plate. Considerable difficulty is sometimes experienced with the single knock-out bar, in that the stripper plate can tilt, thus not completely stripping the work from the multiple punches in the die set.

Fig. 11. By means of this multiple bar, cam operated knock-out, knock-out pins can be placed in the die at any point along the knock-out bars.

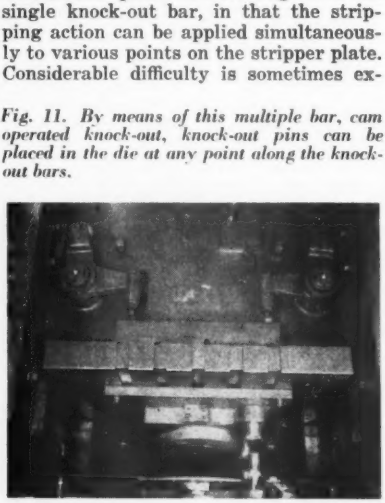

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Fig. 1. Left-hand view of Gorton 2-28B Horizontal (plain type) Milling Machine for heavy duty production work.

A feature of engineering interest relative to the new Gorton No. 2-28B Horizontal Mill is the fact that its design was "started from scratch" without the necessity of using any existing patterns or components of previously designed machines. The George Gorton Machine Company, with a half-century of experience in building machine tools and precision-type vertical milling machines, has been free to develop construction and design features without effecting any compromises with what has gone before.

Each and every part of the machine has been so developed and built as to constitute a maximum contribution to the whole and is not an adaptation from, or compromise with, a previous model. The Gorton engineers were under no compulsion to modify or deviate from what they considered "best" in order to accommodate one or more "standard parts".

This has resulted in a horizontal miller which meets today's requirements with all of its components so correlated in design and function as to perform effectively as a complete unit.

Gorton No. 2-28B Hor features Extreme Rigidity and

Throughout the evolution of the machine tool, a great many engineers and machine tool builders have experimented with various types of construction as applied to the column of knee-type milling machines to the end that maximum strength, stiffness and rigidity are provided by this basic supporting member. Various patterns of internal ribbing have been developed to accomplish this purpose. Extensive tests have been devised to determine the effectiveness of internal ribbing so that today the column of any good knee-type mill is comparatively free from undesirable vibration.

In their project of "designing from scratch" Gorton engineers realized that all efforts to increase rigidity and reduce vibration in the column are of little importance if the knee, saddle and table are not also designed to match the rigidity of the column, i.e., it is fully as im-

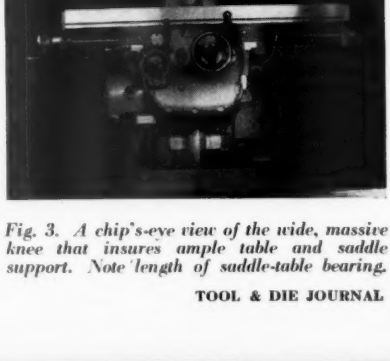

Fig. 3. A chip's-eye view of the wide, massive knee that insures ample table and saddle support. Note length of saddle-table bearing.

Horizontal Mill

and Power

portant to provide satisfactory support for the work-piece as it is to assure rigid support for the cutter spindle.

Designers, engineers and operators all realize that any lack of stability inherent in knee, saddle or table results in unsatisfactory performance. Accordingly, the new Gorton horizontal production milling machine has been designed and built to the stipulation that the column must incorporate the most effective use of mass and ribbing for maximum rigidity and absence of vibration and the knee, saddle and table must be designed and attached to the column to provide the same rigidity and absence of vibration in order that the work-piece may be satisfactorily supported.

The column structure of the Gorton mill is of the closed back type. The motor, mounted within the column and parallel to the spindle, is installed through a small service door in the left-hand side of the column. Its shaft extends through

Fig. 2. Cutting cast iron at 74 rpm spindle speed and 5⅛" table feed with high speed steel cutters on the new Gorton.

a rear opening just large enough to provide clearance for up and down movement when it is necessary to install the motor belt or compensate for belt stretch or wear. An additional opening on the right-hand side of the column provides access to the motor bolts on that side.

Consequently, from a structural point of view the back of the column may be considered solid because of the small motor shaft opening. The side openings which are located in the neutral axis of the column together with the louvered belt guard on the back of the column provide three-way ventilation for the motor chamber and belts.

A milling machine knee must be mounted in such a manner that it will hold securely to the column face under the loads imposed on it during the milling operation. These loads are resolved into two principal planes, horizontal and vertical.

A wide column face, providing a wide spread of knee bearing parallel to the table is essential because a heavy milling load tends to turn the whole knee ele-

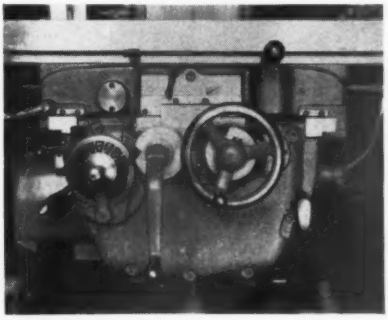

Fig. 4. A close-up view from the operator's position, showing convenient grouping of controls, all of which are fully directional.

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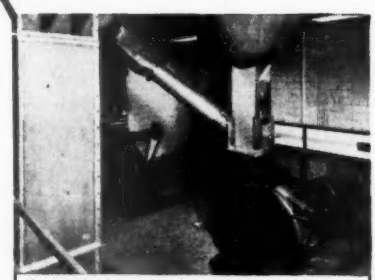

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ment due to the cutting thrust in a horizontal plane. Equally important is the length of the bearing in contact with the column face in order to give maximum resistance to the tipping action of the knee and table in the vertical plane.

To meet these requirements, the Gorton designers have provided two sets of bearing surfaces between the knee and column. One, of 11½" width on the column face insures the greatest stability and rigidity in the horizontal plane, and the other, 5" wide and with a vertical bearing surface of 17" (a high length to width ratio) provides the maximum resistance against the tipping action of the knee.

To further the rigidity between the heavy knee and column, and to provide the most accurate and sensitive adjustment between knee and column in the vertical and horizontal planes, the Gorton production mills feature the square lock type of bearing such as is used on larger and heavier machines. This more expensive construction is employed for both sets of knee-column bearing surfaces rather than to depend upon a dovetail bearing and tapered gib arrangement to take up play in two directions perpendicular to each other.

The Gorton knee and saddle bearing areas provide equal assurance of stability, accuracy and long life. They combine a wide spread bearing support that provides stability in the vertical plane with a bearing of the narrow guide type which insures accurate alignment and prevents cocking of the saddle during the cross feeding movement. Here again, the Gorton construction features the square lock type of bearing in contrast to a combination v-type bearing.

Requirements for the rapid removal of metal, especially in milling operations, have been stepped up from year to year. To meet today's needs the Gorton 2-28B production mill is powered with a 10 hp spindle drive motor. Due to the Gorton engineers' evolution of this machine "from scratch" it was not a case of putting a bigger motor on an earlier model machine. Consequently, the entire machine has been engineered to make use of this excess power to best advantage.

Fig. 5. Another cast iron job running on the 2-28B. A 10" diam. inserted tooth carbide face mill taking 3/16" depth of cut, 8" wide, at 226 spindle rpm and 24½" table feed.

The feed train is driven by a separate motor so that this load is not subtracted from the spindle power available. The entire spindle drive, including the motor, is parallel to the spindle, hence no right angle transmission of power is involved. The gear train itself contains only three shafts, including the spindle, and has only two gear contacts at any speed. The 10 hp flow is direct from the motor to the machine pulley to the primary gear shaft to the spindle.

The Gorton horizontal mill is electrically controlled as far as the reversing of spindle rotation and the starting, stopping and jogging of the machine are concerned. As a further contribution to precision in repetitive operations, the electrical control equipment is mounted so that no heat from the control elements and transformers is transmitted to the machine structure.

The feed controls, grouped at the front in a small area, and a push-pull "stop" handle mounted on the front of the knee, are all convenient to the operator's position. All the power feed levers and particularly the cross feed and elevating control levers are directional in operation; and all control levers are in the most convenient locations relative to their respective functions.

Die Casting Die Design

Part IV

Sprue, Runners, Feeds, Gate, Overflows and Vents

We shall now proceed to discuss the design of sprues, runners, feeds, gates, overflows and vents. However, before we proceed with this discussion, it is essential that these terms be defined, plus two additional terms, namely "spray" and "get".

The definitions which are given are British in origin, with but one or two exceptions and are given here with the hope that they may find favor with the American die-caster, die maker and die designer, for, in the opinion of the writ-

by H. K. Barton
and
James L. Erickson

ers, there is a great need in America for this more precise terminology.

Nomenclature

SPRAY: The whole die cast piece as it is removed from the die casting die is known as the spray, Figure 1. This consists of the die cast part proper and all of the metal attached to it, such as the runner system and sprue or biscuit or butt, the flash and overflows, lugs, etc.

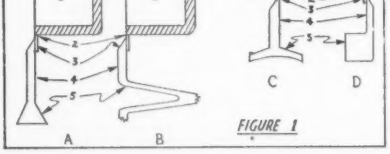


Fig. 1. (A) Side-gated die; (B) Center-gated die; (C) Vertical cold-chamber machine die; (D) Horizontal cold-chamber machine die. (1) Casting; (2) Gate; (3) Feed; (4) Runner; (5) Sprue, butt, or biscuit.

GET: The term "get" (although it is a corruption), is suggested by the authors for all of the connective metal when taken collectively, such as the runner or runners. This is because it is expressive of the functions of that particular piece of metal. The "get" is subdivided into sprue, runner, feed and gate, Figure 1.

SPRUE: The sprue or butt, 5, Figure 1, is that portion of metal immediately adjacent to the nozzle of the machine. In center-gated dies, it runs from the back to the front of one of the die members and in the case of the side-gated type of die casting machines, appears as an enlarged mechanical end to the runner.

RUNNER: The runner, 4, Figure 1, is that part of the "get", which is, or should be, of substantial constant cross-sectional area and which connects the sprue (5) with the feed, (3).

FEED: The feed (3) comprises the metal adjacent to the casting (1) and connects the casting with the runner. It is generally of diminishing cross-section and terminates in the gate (2), the latter being the point of junction of the "get" and die cast part proper.

The terms sprue, butt, runner, feed and gate are applied not only to the parts of

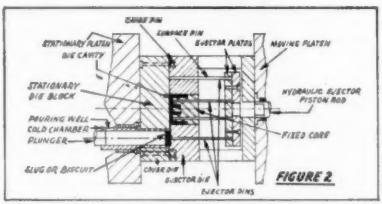
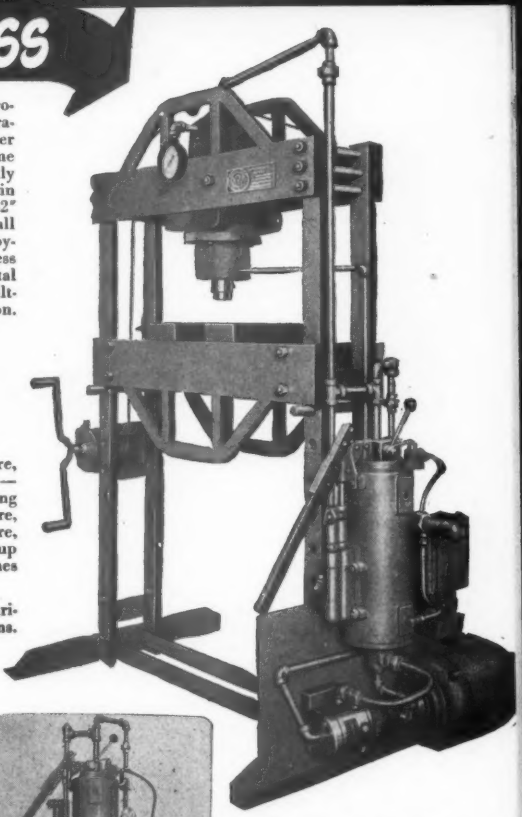


Fig. 2. Diagrammatic sketch of a die mounted on a horizontal cold-chamber die casting machine. Black area represents the "spray." Note that the injection chamber or "pouring well" consists of a single, continuous sleeve that runs through both the stationary or fixed platen and the stationary or cover die half.

OOK AT THIS PRESS

's designed to provide industry with low-cost, high pro-uction units that are highly flexible in design and opera-on... relieving heavier presses of short runs and lighter ork. Presses are practically fool-proof in operation. Frame extremely rugged. Fingertip controls are conveniently cated at hand level. Available for immediate delivery, in ndard width (between uprights) of 24"—31"—36"—42" spectively. Available in special width up to 72" at small ditional cost. Movable bed plates. Pumping unit has by-ss relief valve which can be set at any pressure up to press pacity. Presses available for either vertical or horizontal eration. *All Standard* presses equipped with 2-speed built-hand pumps for more sensitive and versatile operation.



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YLINDERS: *Standard Models* furnished with 6" bore, " stroke — spring return type; also 5" bore, 7½" stroke — ring return type. Above presses are *standard.* Following n be furnished at additional cost: Double Acting, 6" bore, stroke; 6" bore, 11" stroke; 5" bore, 7" stroke; 5" bore, " stroke. Special long stroke cylinders also available, up 48" in length, for incorporation in suitable press frames our make.

UMPING UNITS: These units can be supplied in vari-s volumes and pressures, in a total of 13 combinations.

esses include V blocks, Gauge, Motor Controls, essure Regulator, etc., complete and ready to ach to electrical source.

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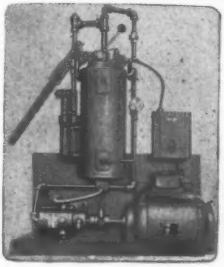
ere are so many everyday production uses for ese versatile KRW Hydraulic Presses that we ve lost count. Here are a few of the more obvious blanking, forming, bending, broaching, straight-ing, stamping, embossing, numbering, upsetting, minating, pressing and hot or cold forging. KRW gineers are daily developing other uses. If you ve only a vague idea of how these presses might used in your plant, let us have it in a rough form. 'll do the rest.



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pending upon capacity of pumping equipment, prices Standard model motor driven hydraulic presses are as llows, F. O. B. Factory: 25-ton press from $727.00 to 92.00. 50-ton press from $806.00 to $1058.00. 60-ton ess from $1070.50 to $1135.00. 75-ton press from 98.00 to $1258.00. All motors in the above units are 0/440 volt, 3 phase, 60 cycle. Any change in motor ecifications is extra. **Subject to change without notice.*

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the get, but also to the impressions in the die in which they are formed. Their applicability to the various types of dies, including cold chamber dies, is shown in Figure 1.

OVERFLOWS: In addition to the runner channels, which conduct the molten metal to the die cavity in which the die cast proper is formed, there may be employed comparatively small impressions into which the molten metal is forced outward from the cavity. These are of two types: First, those employed for the purpose of providing pads of metal on which ejectors may bear in those instances where it is desirable that ejector marks should not appear on the die cast part. These are known as 'ejector lugs' and are joined to the die cast part by a **lug-gate**; Second, larger bodies of metal attached to the die cast part which serve as feeding heads or risers and are termed **overflows** or **wells.**

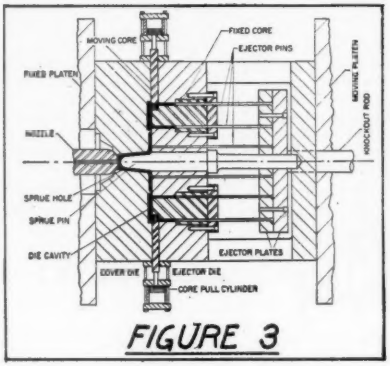

Fig. 3. Diagrammatic sketch of a die mounted on a center-shot, warm-chamber die casting machine.

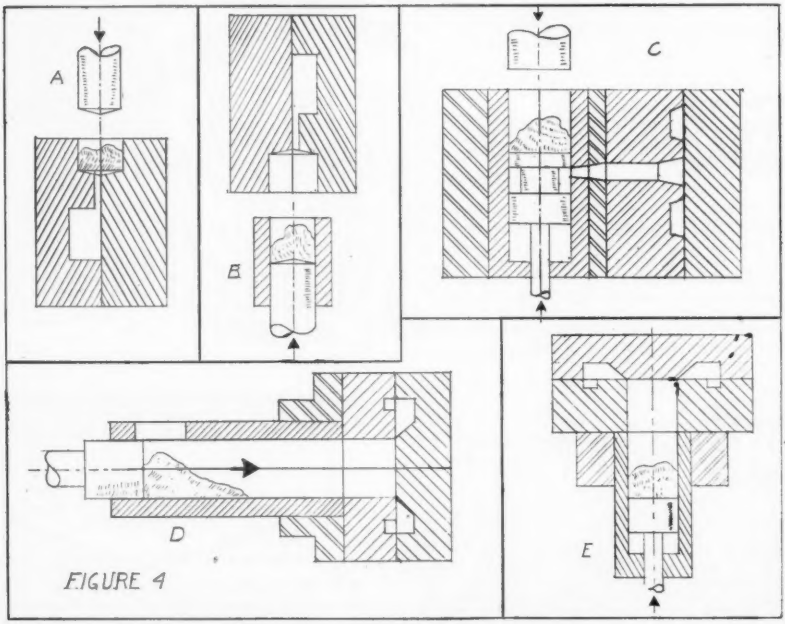

Fig. 4 shows various cold-chamber injection methods: A, vertical, metal-well in top of die; B, vertical, metal-well below die; C, vertical, metal-well in fixed platen; D, horizontal, metal-well in moving platen; E, vertical, metal-well in table beneath fixed die member.

"WISE ECONOMY RESULTS FROM WISE SELECTION OF CUTTING FLUIDS"

THE case studies listed below of benefits derived from the soundly engineered application of D. A. Stuart cutting fluids will unquestionably appeal to cost-conscious management and production men. These reports are typical of those received daily.

An Eastern firm operates a special threading machine for simultaneously threading three BX connectors drawn from SAE 1010 sheet. Running at 68 S.F.M., finish was unsatisfactory. A change to D. A. Stuart THREDKUT produced a satisfactory finish and increased production. In addition, die life was increased 3 to 4 hours.

A rifle manufacturer crush dress grinding 8640 roll hardened (Rockwell C40) bolts was obtaining 15-20 pieces between dressings and crushing roll performance was poor. Selection of D. A. Stuart SUPERKOOL 81-X gave them over 300 pieces from one wheel dressing.

It is significant that in both of the above cases, selection of a cutting fluid was made on a basis of *performance*, rather than price or opinion.

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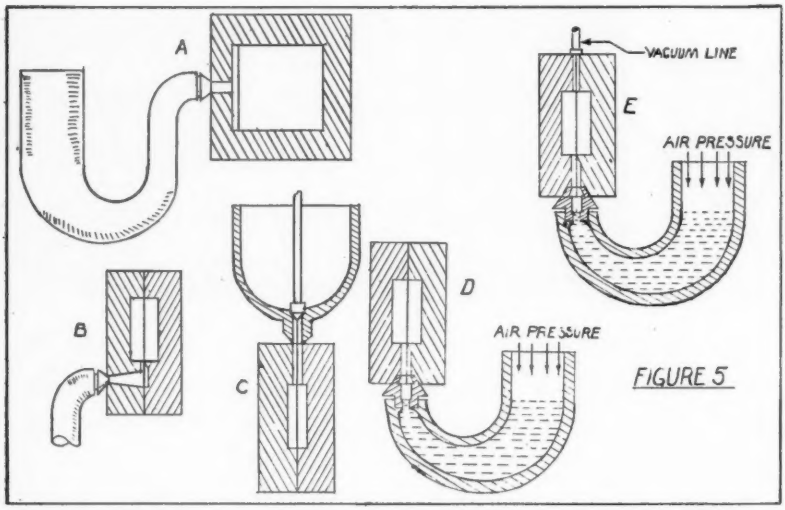

Fig. 5. Various injection methods: A, horizontal flow, side-gated die; B, horizontal flow, center-gated die; C, down-flow; D, up-flow, direct air pressure on metal; E, upward flow, air pressure augmented by simultaneous evacuation of the die cavity.

Design of the Sprue

The design of the sprue is, of course, determined by the type of die casting machine on which the die is to be run. If, for example, the die is to be run on a horizontal cold chamber-type die casting machine, Figure 2, the sprue will be similar in shape to that shown at D, Figure 1, while if the die is to be operated on a warm chamber, center-gated-type of machine, Figure 3, it will be similar to that shown at B, Figure 1.

There are five major types of cold chamber machines currently operated in the United States and Great Britain, Figure 4 and each of these calls for a different sprue design.

There are five distinct types of warm chamber-type machines, Figure 5; however, of these, only three are in significant commercial use, namely A, B and D, and, even so, only B is widely employed.

For the sake of brevity, our discussion of sprue will be confined to the two most commonly employed die casting machines; i.e., the horizontal cold chamber-type and the center-gate warm chamber-type.

Horizontal Cold Chamber: In designing the sprue for a die to be employed on a cold chamber machine, the designer should first ascertain the design characteristics of the specific machine on which the die is to be run (1), how far the injection plunger tip will project through

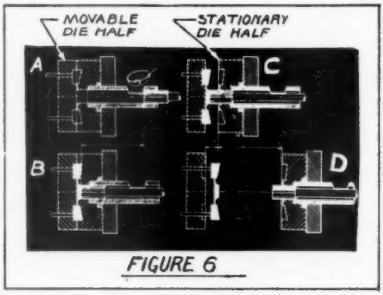

Fig. 6. Sequence sketch showing (a) how the molten metal is ladled into the injection chamber, (b) how the injection plunger forces the molten metal into the die cavities, (c) how, when the die is opened, the injection plunger continues to move forward and shoves the "spray" off the stationary die half, and (d) how the "spray" is ejected from the movable die half.

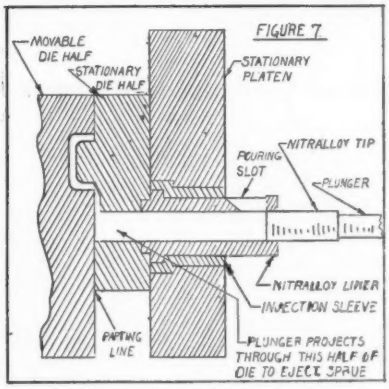

Fig. 7. Cross-sectional view of the Edgwich cold-chamber, horizontal die casting machine's injection chamber and injection plunger. Note that no separate sleeve is employed in the stationary die half and that the injection chamber sleeve projects only a short distance into the stationary die half.

the face of the stationary die platen; (2), the injection plunger tip diameter; (3), the injection plunger tip material; (4), whether or not a separate sleeve must be employed to form the injection chamber within the stationary block of the die; and (5), how much force is to be applied to the die casting alloy during and just after the die filling period.

Once these facts are ascertained, the sprue is designed with an aim to: (1), insuring a minimum of turbulence of the molten die casting metal as it flows from the injection chamber into the runner system; (2), making it possible for the sprue, or biscuit, of solid die casting metal to pull freely away from the stationary die half as the die is opened; and (3), preventing the injection plunger from sticking within the injection chamber as it comes forward to drive out the solid metal biscuit, Figure 6.

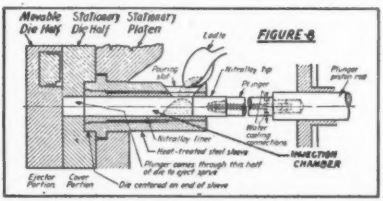

Fig. 8. A nitralloy liner is used inside of the injection chamber of this cold-chamber horizontal machine.

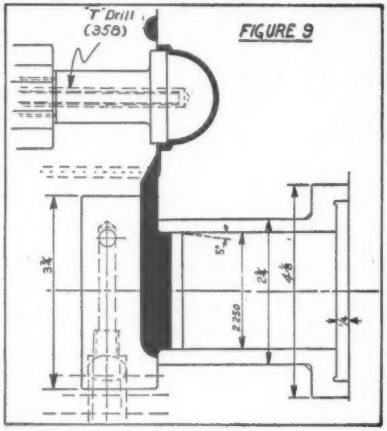

Fig. 9. Typical injection chamber sleeve as employed in the stationary die half.

Illustrated in Figures 2, 7, and 8, are three different types of injection chamber construction.

First, in Figure 2, the injection chamber is formed by a single continuous sleeve projecting through the stationary platen and passing completely through the stationary die block.

Second, in Figure 7, the injection chamber is formed by a sleeve and its liner projecting slightly beyond the stationary platen and into the stationary die half and by the die block itself.

Third, in Figure 8, the injection chamber is formed by a passage through the stationary die block and by a liner within a sleeve that passes through the stationary platen.

Still another method, which is a variation of the second and third designs, is one in which a separate and butting sleeve is also placed in the stationary die block, Figure 9.

The particular design of the injection chamber is determined for the most part by the design of the die casting machine; however, of the four designs mentioned, that shown in Figure 9 is the most satisfactory, provided the injection sleeve liner (not shown in Figure 9) is designed with the replaceable interior liner or sleeve as shown in Figure 8.

(To Be Continued)

New Low-Priced Cylindrical Precision Grinder

A new, low priced, general purpose grinding machine has been announced by the Landis Tool Company.

This grinder, Figure 3, was developed so that there would be available to industry a simple, flexible cylindrical grinder for a variety of operations. It can be used for small-lot manufacturing purposes in small or large shops, toolrooms and for training purposes. For these varied uses it has a generous capacity of 28″ between centers and will swing 12″ diameter work.

Taper grinding is accomplished by swiveling the table as shown in Figure 1. A scale graduated both in degrees and inches per foot facilitates accurate settings.

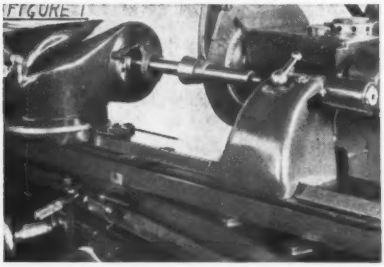

Fig. 1. Grinding a steep taper by swiveling the work table. Note the support pads under the table.

The headstock has an infinite speed range from 85 rpm to 483 rpm, by rheostat control. There are only two revolving parts: the motor spindle and the face plate. This simple construction results in a low compact mechanism which is useful when watching face grinding operations. Precision, face grinding can be accomplished by swiveling the headstock 90° and attaching the workpiece to the face plate as illustrated in Figure 2. The base is mounted on a graduated swivel for setting up angle or face grinding operations.

Internal grinding can be performed by attaching an internal fixture and bracket to the wheelbase and clamping the workpiece in the chuck.

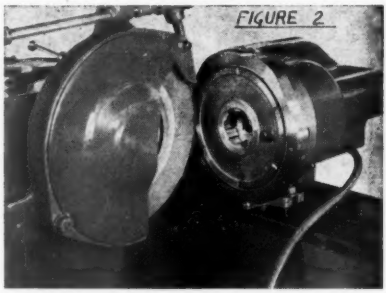

Fig. 2. Face grinding. A precision grinding operation accomplished by swiveling the headstock 90° and attaching the workpiece to the face plate.

Landis Tool Microsphere Bearings are used to support the wheel spindle. These are self-aligning, babbit lined, one-piece steel bearings which will absorb thrust loads.

For complete description and specifications write LANDIS TOOL CO., 28 E. Sixth St., Waynesboro, Pa. Inform-A-Gram Key No. D13.

Fig. 3. Grinding the bore of an internal gear ring. Workpiece held in 4-jaw chuck.

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DON COTTON

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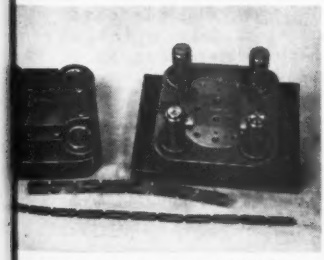

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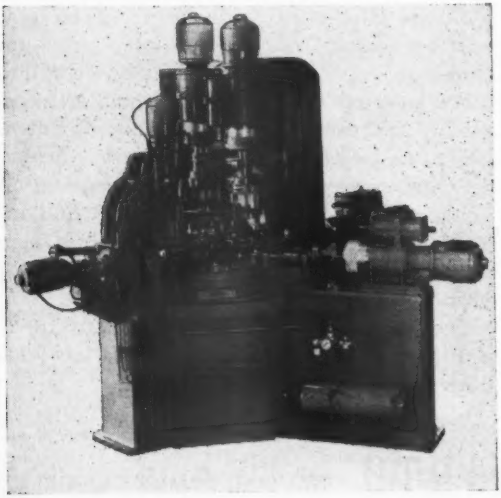
"Cleveland Republic" Drill Units Feature Air-Hydraulic Control

In order to provide Drill Units for a still greater range of manufacturing requirements, the Cleveland Republic Tool Corporation has recently announced their No. 5 Model. The operation of the No. 5 is powered by the same combined air-hydraulic system as used in smaller Cleveland Republic Tool models which have been installed by many of the foremost automotive and other manufacturing plants for drilling, centering, countersinking, facing and milling operations.

The air-hydraulic system incorporates a sealed unit construction which is a feature of all Cleveland Republic Tool units, and which permits their operation in any position. Their design and construction readily conform to the modern tooling practice of grouping single units on simple welded bases rather than building special machines. Thus, any grouping can easily be changed to meet changes in design of the work piece. At the same time, however, Cleveland Republic Tool has standardized the design of four bases, to save time and cost. Only the change of the holding fixture is required when the standard bases are used.

Drill spindle thrust is provided by the plant's air system or an auxiliary supply. The operating principle is based upon a rapid advance to an accurate positive stop, then metered hydraulic feed to another positive stop, and rapid return. The rapid advance travel is consistent to .005" and the work feed to final depth holds to .001". These features are big time-savers in multi-station step drilling, since they permit the drill to pass rapidly through the previously drilled portion of the hole, to within a few thousandths of the bottom, before assuming the feed rate of travel. The accurate stop also leaves the bottom of the hole accurately located for the next station. These features are also of practical value in spotfacing, countersinking, shaft centering and in some cases may supersede intermittent drilling.

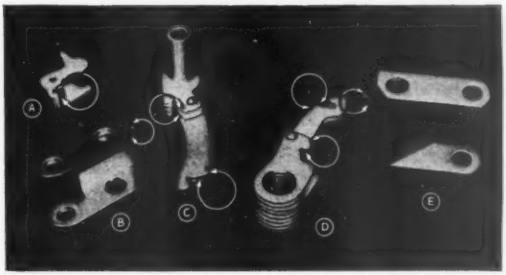
Model No. 5 is the largest Drill Unit offered by the Cleveland Republic Tool Corporation. It is available in two to five-horsepower, and has a maximum stroke of 6". The spindle is normally furnished with a No. 4 Morse internal taper and the quill is designed to be adaptable to multiple spindle drill heads. The units are extremely simple in design since there are only three moving parts in addition to the spindle. They are ruggedly constructed and will give long service, with a minimum of attention. The units are available in four to six weeks from receipt of complete information as to the job specifications.

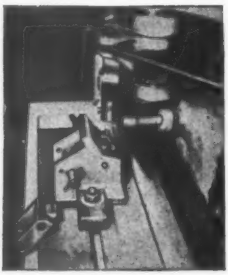


A special machine using Model No. 5 Drill Units. Full details and specifications obtainable from Cleveland Republic Tool Co., 9615 Meech Ave., Cleveland 14, Ohio, or circle ***Inform-A-Gram Key No. D11.***

How to take the guesswork out of contour-grinding

Moore Panto-Crush Wheel Dressers Step Up Latch Output 30% for I-T-E, Assure Interchangeability of Parts.





Contour grinding of latch level—Part "E" at left. Here two surfaces and two radii, including inside fillet, are being ground simultaneously.

Five principal I-T-E circuit breaker parts finish ground with Moore Panto-Crush Wheel Dresser. Surface areas between arrows are ground. A comparison of pieces per hour between new method and old method follows:

Part	Moore Panto-Crush	Old Method	Saving
A	22	15	33%
B	32	22	31%
C	31	18	42%
D	14	12.5	10%
E	25	17	32%

I-T-E's experience with Panto-Crush Wheel Dressers was fully reported in "American Machinist." We'll gladly send you a reprint and our catalog.

They've taken the "by-guess-and-by-gosh" out of the contour-grinding of toggle latches at I-T-E Circuit Breaker Company, Philadelphia, switchgear manufacturers. Moore Panto-Crush Wheel Dressers have solved the problem of accurate, interchangeable production of these moving mechanical parts so essential to faultless circuit breaker operation.

Irregular contours are now ground by wheels diamond-dressed to exact dimensions within .0002". Before installing Moores, I-T-E ground the contours by shifting the parts at different angles. Accuracy and field interchangeability suffered. Today both are completely satisfactory, and output itself is up 30%!

The Panto-Crush is mounted on the wheel spindle of a surface grinder. It is the only wheel dresser combining a precision-built pantograph for guiding the diamond from a template and a self-driven crush former. You switch from one to the other without removing workpiece.

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SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

Photographs, courtesy the Norton Company, Worcester,

Precision Tumbling

In the past, deburring operations as well as surface finishing operations on a wide variety of miscellaneous parts have been done on bench grinders or with small portable grinders. In many instances such operations are being eliminated today by precision tumbling with specially prepared abrasives.

The accompanying illustrations of tumbled metal stampings indicate the variety of applications being made of this process. It has been found that abrasive tumbling produces uniformity in such operations as breaking sharp edges, producing radii to blueprint specifications, finishing operations, and also has brought about improvement of microinch finishes. It controls dimensional loss and increases wear-resistance of parts.

Further, it has been found that abrasive tumbling increases the life of tools and dies used in making parts which have to be machined after the removal of burrs. Heavier burrs can be left on the work and this permits using tools slightly longer between grinds. These heavier burrs can then be removed easily by the abrasive tumbling process with increased production and economy.

A product known as "Alundum Tumbling Abrasive" has been developed by the Norton Company. It is a manufactured aluminum oxide abrasive. All of the material is true abrasive, giving a continuous cutting action without glazing and a surface finishing action without addition of any polishing compound. Its heavy weight, which is a most important factor in tumbling, combined with its toughness and hardness, insure a long and productive life.

Alundum Tumbling Abrasive is available in either tumbled or untumbled form in a wide range of grit sizes. The untumbled abrasive can be used only for a first run on so-called "roughing operations". After the untumbled abrasive has been used on the roughing operation or tumbled in a preliminary run of approximately two hours, it can be considered to be in a tumbled condition. Untumbled material has sharp corners and edges which give a fast rate of cut but also a rougher finish. For operations where the fast cutting of untumbled abrasive is not desired, but rather a more mild finishing action, pretumbling at the Norton plant provides a product ready to use. It thus becomes ready for establishing time cycles and for setting up standard procedures.

An illustrated, instructional booklet entitled "Precision Tumbling with Alundum Abrasive" is available from the Norton Company of Worcester, Mass. It gives job case histories, abrasive size and grit recommendations, procedures for different tumbling applications, and comments on equipment. ***Use Inform-A-Gram Key No. D14.***

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

(CONTINUED FROM PAGE 45)

special alloy iron base with an accurately scraped vee-way for the master worm section. The base contains a fixture arm, a fixture arm yoke with lead angle adjustment, and an indicator, all of which are equipped with suitable adjusting and locking devices. The work-holding fixture, or arbor, is designed to accommodate the gear to be checked. A hardened and ground bushing together with a machined step in the fixture arm face provide accurate positioning of the work fixture relative to the plane of the master worm section. The work fixture has an offset datum surface which does not interfere with the normal operation of the master worm section in its slideway. The datum surface, which may be cylindrical, is ground to the theoretical testing diameter of the work gear. Likewise, an offset datum pad is provided on the master worm section. When these two datum surfaces are placed in contact with each other and the indicator set at zero the gage is in adjustment for size. The datum surfaces offer a method of rechecking the setup at the convenience of the operator. Since the master worm section is ground with a slight lead angle, the fixture arm position relative to the vee-way must equal the lead angle of the worm section. Figure 3 shows the simple sine bar arrangement for making this setting. A micrometer screw containing a drum graduated in half minutes of arc contacts a vertical ground stud. The total range of this adjustment is 20 minutes of arc, which is sufficient for the gear range of this instrument. The sensitivity of this instrument is very high. The operating pressure between work and master seldom exceeds four ounces.

The 4-U Conju-Gage, Figure 4, although in principle similar to the 1-S Conju-Gage, incorporates a number of features which increase the ease and rapidity of inspecting the larger gears for which it was designed. The active length of the master worm section is used is 13⅛″, permitting gears to be checked having a pitch diameter up to 4½″. The pitch range for gears that would normally be inspected on an instrument of this size is 16 to 48, although the instrument is by no means restricted to this range.

Work centers are mounted on an accurate sector permitting rapid positioning of the work gear axis to any helix angle up to 45 degrees either right or left hand. The sector is revolved by means of a worm and worm gear operated by the handwheel on the left side of the work carriage. The smooth action of this mechanism with its easily read vernier scale simplifies the setting of helix angles. Conversely, given a gear of unknown helix angle, the true helix angle can be determined directly on the circular scale by moving the cradle back and forth until the lowest indicator reading is obtained. This feature permits an accurate check of the true helix angle produced in the gear teeth. A cross-slide is provided which permits a horizontal movement of the work past the worm section. The cross-slide affords a ready means of checking taper by noting the difference in radial separation from one end of the gear to the other. In checking crown, the thickest portion of the gear tooth is found by moving the cross-slide until the highest point is indicated by the recorder. By moving the cross-slide the same arbitrary amount each side of the zero or center position the difference in tooth thickness or amount of crown can be observed. The position of crown relative to the face width can likewise be located.

The handwheel in the lower right front of the instrument operates a precision ground lead screw and permits pitch radius setting within the range of the gage by means of a dial graduated in thousandths of an inch. Supplementing the pitch radius adjustment, a micrometer screw located in the center of the lead screw handwheel permits rapid return of the indicator to zero. Sensitivity is assured by mounting the work slide on ball bearings. The moments of inertia of the work carriage have been calculated to give a sensitivity response of 60 cycles per second for 0.001″ of travel. This results in the exploration of a very large number of points on the tooth profile. The pressure between work and master worm section is obtained by means of a counterweight attached to the slide. This weight is made to agree with the checking pressures recommended by A.G.M.A. Standard 236.01.

This instrument is equipped with an electronic charting device which charts the radial displacements occurring between the master and work. The recorder may be adjusted to any one of four different magnifications, such as 100, 200, 400 and 800 to one, and the paper speed can be changed to provide either an extended chart for analytical purposes or a contracted chart for paper economy where a permanent record of all the gears checked is desired. The repeatability of the recording instrument is believed to be unmatched in any other gear recording device. A number of charts made of the same gear at a given magnification can be made to coincide with each other perfectly.

To aid the operator of the Conju-Gage in evaluating the composite error, a chart is furnished which shows the separate errors which make up the composite check. On this reference chart, runout is depicted as a sine curve; profile error shows up as a saw-tooth wave; tooth thickness variation is represented by a sudden peak extending over a single tooth; and errors in circular pitch look like a blunt plateau usually embracing more than one tooth. These errors are invariably combined with one another to some degree. They seldom appear singly. By the aid of this chart an operator can, in a very short while, become expert in separating and evaluating the errors.

The 8-U Conju-Gage is essentially similar to the 4-U model except that its size has been increased to check gears up to 8¼" pitch diameter.

It was recognized that the operator at the gear cutting machine should be provided with a simple, rugged, and quickly operated instrument to enable him to detect size change. Consequently, the Composite Backlash Checker, shown in Figure 5, was designed to supplement the Conju-Gage equipment.

This instrument tells the operator when the size of the gears exceeds the prescribed limits and also enables him to approximate how much runout is in the gear. It gives a quick and reliable check of backlash through the arc of action. This type of check for size differs from checks made by means of pins or balls. It is well known that pin or ball measurements of gear teeth have definite limitations. They are not sensitive to changes in pressure angle or errors in circular pitch and tooth thickness. Furthermore, the points contacted by the pin or ball must be located on the theoretical involute curve in order not to influence the reading for size.

When gears are meshed together the change in backlash at any instant of tooth engagement is affected by all the errors that are present in the gear through its arc of action. A check for backlash in gears should, therefore, duplicate as closely as possible the gears in mesh. This means that the gear being checked should engage a master and that the arc of tooth engagement should be at least as large as that of the gear being checked and its mate. This method of checking gives the true change in center distance when mating gears are meshed.

In order to impart the "feel of roll" to this gage, which is required to detect tooth to tooth error, provisions are made for moving the worm section in its veeway a distance of several pitch increments.

The Composite Backlash Checker consists of a base, an adjustable work-holding fixture, a reed gage head carrying a cylindrical master worm section, and a dial indicator. A dovetail in the base carries the work-holding fixture, which has a fine adjustment for positioning the gear to be checked. The cylindrical master worm section is held in a vee-block attached to the reed mechanism. This vee-block may be turned on its axis and locked. Thus, one master worm section of the same normal pitch and pressure angle as a gear to be checked, can be used to check spur or helical gears of either right or left hand.

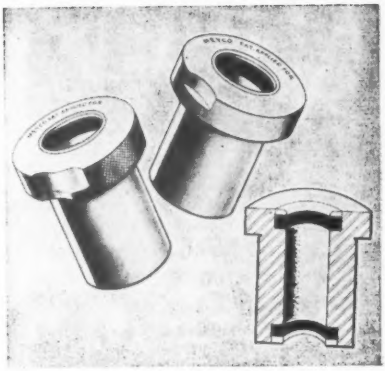
By means of this instrument an inexperienced operator can make rapid and accurate backlash determinations without the least knowledge of mathematics.

This instrumentation for gearing which evolves from the master worm section is a new concept in gear checking; a concept which, it is hoped, will find its place in the gear art and contribute materially to quality control of gear production and performance.

Drill Jig Bushings

An average of 36 percent reduction in the price of MEYCO Carbide-Inserted Drill Jig Bushings has been announced by the manufacturer, W. F. Meyers Company. This reduction applies to all standard MEYCO Carbide-Inserted bushings listed in their latest catalog, which is now available.

Made of hardened alloy steel, with two carbide rings inserted at the maximum points of wear, MEYCO bushings provide both the protection of steel and the long life of carbide. They are made to the dimensional standards of A.S.A.



Some of the other outstanding features of these bushings are as follows: (1) longer life—in most cases equal to that of solid carbide bushings—at a price approximating that of ordinary steel bushings; (2) ability to increase the life of drill jigs and fixtures; (3) maintenance of accuracy for a long period of time; (4) reduction of non-productive machine time and non-productive man hours because of less frequent changing of bushings; (5) production of less waste of parts due to spoilage, because accuracy is maintained; (6) saving on inspection time for the same reason.

For complete information on MEYCO bushings, ask for Catalog No. 17 from W. F. MEYERS CO., 1017 14th St., Bedford, Ind.

Inform-A-Gram Key No. D4.

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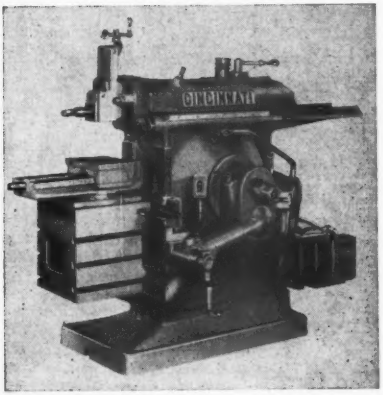
INFORM-A-GRAM KEY NUMBERS

Utility Shaper Re-introduced



The Cincinnati Utility Model Shaper, out of production for eight years, is being manufactured again, with improved construction and advanced features, by The Cincinnati Shaper Company.

Embodying the many refinements found in the larger Cincinnati models, the Utility Shaper is equipped with higher speeds, making the use of carbide tools on shapers a practical and profitable application. Cutting speeds over 250 ft. per minute are possible on a 10″ stroke.

The table of this machine is supported directly on the cross-rail without an apron and is heavy enough to take the full load without table support. This construction adds to the rigidity of the table by reducing the overhang.

Made in 16″ and 20″ stroke sizes, the Utility Shaper also offers automatic lubrication to all bearings, including the table bearing on the rail. Write for Bulletin T-6 to THE CINCINNATI SHAPER CO., Dept TDJ, Cincinnati 25, Ohio. Inform-A-Gram Key No. D2.

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NUT of alloy steel, heat treated with Class 3 fit thread, and washer face commercially square with threads.
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SELF-DRESSING, CENTERLESS GRINDING WHEELS are offered in a recent folder from Mid-West Abrasive Company. These wheels virtually eliminate costly wheel dressing shut-

downs—costly in terms of lost production, lost time, lost wheel life and diamond cost. Made with a special tempered abrasive grain, held firmly by an exclusive bond, Mid-West wheels operate smoothly and assure rapid stock removal. This two-color folder contains case histories showing the superior performance of the wheels. An important and instructive section of the folder is entitled "How to Get the Most Out of Your Self-Dressing Wheel." Send for your copy to MID-WEST ABRASIVE CO., 512 S. Washington St., Owosso, Michigan.
Inform-A-Gram Key No. B1.

WILLEY'S METAL and the many outstanding tools made from it, are featured in a beautifully-covered catalog of 66 pages just issued by Willey's Carbide Tool Company. Characteristics of the various grades of metal are listed and many valuable grinding tips are included. Specifications, illustrations and prices are given for the company's complete line of tools. A whole section is devoted to diamond tools and mechanical dressers. For Catalog No. 449 write WILLEY'S CARBIDE TOOL CO., 1340 W. Vernor Highway, Detroit 1, Mich.
Inform-A-Gram Key No. B2.

"ENGINEERED" LIVE CENTERS, with a low over-hang and a slight cushioning action that compensates for expansion due to heat, shock and excessive thrust loads, are fully described in the new, four-page Catalog No. 449 released by Sturdimatic Tool Company. Spe-

cifications and prices of standards and specials are included, along with illustrations. STURDIMATIC TOOL CO., 5520 Third Ave., Detroit 2, Mich.
Inform-A-Gram Key No. B3.

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

PUBLICATION PREVIEWS

THE ELECTROLYTIC STENCIL ETCHING PROCESS, for fast, safe and accurate parts marking, is completely described in a new, two-color folder published by The Lectroetch Company. The Lectroetch Process is a new and unique method for marking metal parts and tools. Instead of using acids, cutting, hammering, punching, burring or writing, Lectroetch uses Electrolysis. For inspection marking and for placing similar small designs in otherwise inaccessible positions on parts of all sizes, a Pen-Type Unit has been designed. Quick, dependable marking is accomplished by merely holding pen to the part for one or two seconds. The operation of this unit is fully detailed. THE LECTROETCH CO., 14925 Elderwood Ave., East Cleveland, Ohio.
Inform-A-Gram Key No. B4.

TOGGLE CLAMPS, for clamping parts in production quickly and positively, are fully described and pictured in Catalog No. 49, the latest publication of Detroit Stamping Company. All De-Sta-Co toggle clamps are quick acting, lock automatically and hold firmly. The normal time for opening or closing one is less than two seconds. If an operator should fail to nest a part correctly in the fixture, or chips should interfere, the toggle clamps will not readily lock into position, thus giving ample warning before the operation can be performed incorrectly. Stampings and other products made by the company are also treated briefly in this catalog. To obtain your copy, write to DETROIT STAMPING CO., 340 Midland Ave., Detroit 3, Michigan.
Inform-A-Gram Key No. B5.

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"DRYSEAL" PIPE PLUGS, which are positively leak-proof, metal-to-metal joints without a sealing compound, and Standard pipe plugs, are featured in new literature from The Allen Manufacturing Company. These "Truround" pipe plugs are made of Allenoy steel and have smooth burnished threads, uniform taper and strong, clean sockets. Both types are available in a full range of popular sizes. Dimensions and prices are listed. Write to THE ALLEN MFG. CO., 133 Sheldon St., Dept. DS, Hartford 5, Conn.
Inform-A-Gram Key No. B6.

B-R AIR CYLINDERS, manufactured by Richter-Shillair Company, are presented in a booklet of dimensions, diagrams and drawings. Each type of cylinder is illustrated at the top of its respective page. Then diagrams of the front view and the dimensional reference view for all bores are shown. Next comes the chart of dimensions. A completely labeled parts replacement chart is also included in this publication. Write for it to RICHTER-SHILLAIR CO., Dept. TDJ, 1317 S. Park St., Saginaw, Mich.
Inform-A-Gram Key No. B7.

SOLID CARBIDE TOOLS are presented in a new catalog received from Raymac Manufacturing Company, Inc. An outstanding tool in the Raymac line is the solid carbide centerlap, which eliminates costly dressing and duplicates center angles many times over. It can be used on any standard drill press, center lapping machine or lathe at normal speeds. Solid carbide drills are also featured in this catalog. They are designed for the actual drilling and cutting of hardened metal; they do not anneal or burn the part. Speed required is 350 to 600 rpm, depending on the size and hardness of the metal. RAYMAC MFG. CO., INC., 3729 Cass Ave., Detroit 1, Mich.
Inform-A-Gram Key No. B8.

"HOW TO STORE, HANDLE AND USE ARBORS" is a valuable section of a new booklet on arbors and accessories made by The Cincinnati Milling Machine Company. General precautions which should be observed when handling arbors are listed in this helpful article. The remainder of this well-illustrated publication is devoted to all types of arbors, collars, collet adapters, bushings and other accessories — their dimensions, catalog numbers, etc. This 23-page booklet may be had from THE CINCINNATI MILLING MACHINE CO., 4701 Marburg Ave., Cincinnati 9, O.
Inform-A-Gram Key No. B9.

METAL CUTTING BAND SAWS, specially treated to give extra long cutting life, are described in a new, illustrated catalog from Atlantic Saw Manufacturing Company. Included is an interesting discussion of the uses of band saws. A complete list of the sizes of saws used on all popular machines is given. Another useful section is the chart of approximate cutting speeds recommended for various materials. Address ATLANTIC SAW MFG. CO., 153 Brewery St., New Haven, Connecticut.
Inform-A-Gram Key No. B10.

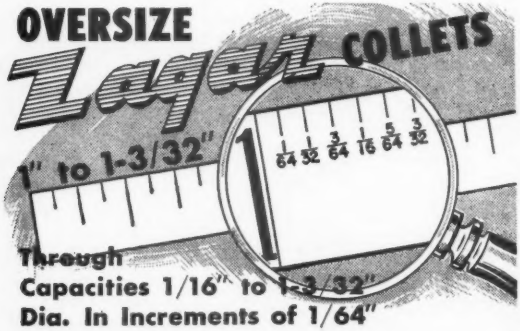
LUBRICATION DEVICES AND SEALS are presented in the new, illustrated price guide catalog published by Gits Brothers Manufacturing Company. This 12-section catalog contains complete price informaiton, table of advantageous discounts, necessary specifications and other useful material. The Gits Roto-Flex Seal, perfected to answer rotating shaft seal problems, is featured. It is in constant use with any type of equipment requiring a positive seal to prevent leakage of liquids or gases, along with a rotating shaft, when under pressure or vacuum. There are many industrial applications of the Roto-Flex Seal. GITS BROS. MFG. CO., 1834 E. Kilbourn Ave., Chicago 23, Illinois.
Inform-A-Gram Key No. B11.

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

PUBLICATION PREVIEWS

GEM MACHINE VISES fill the important requirements of ease of operation and long life when used on drill presses, milling machines, shapers, grinders and other machines. These heavily constructed vises, manufactured by J. E. Martin Machine Works, are described in a new brochure from the firm. Several types of Gem Vises are illustrated. One cut shows their simple and unique design. By merely pulling adjusting pin from nut, the entire movable jaw assembly can be slipped off instantly. A description of a tilting base for the No. 2 vise is included. Folder may be had by writing to J. E. MARTIN MACHINE WORKS, 548 W. State St., Springfield 15, Ohio.
Inform-A-Gram Key No. B12.

WHAT'S NEW IN PRECISION INSTRUMENTS? The new Tumico Catalog No. 20, issued by Tubular Micrometer Company, does a complete job of answering this question. This loose-leaf book contains 80 pages devoted to descriptions and pictures of all the measuring instruments made by the company, including the Tumico Tubular Micrometer. The weight of this micrometer has been reduced up to 50% of common solid-frame instruments. This factor makes it possible for the user to obtain precision readings with far less effort than required with a solid-frame micrometer of equal size. TUBULAR MICROMETER CO., P. O. Box 29-A, St. James, Minn.
Inform-A-Gram Key No. B13.



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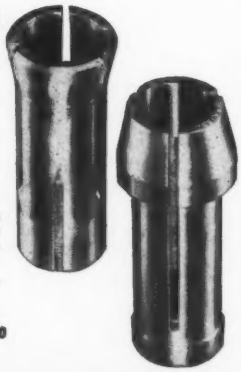

Zagar TOOLS FOR INDUSTRY and SPECIAL MACHINERY

SILVER ALLOY BRAZING with Easy-Flo and Sil-Fos, developed by Handy & Harman, is depicted in an interesting publication, "Low Temperature Brazing News No. 46", just received from the company. Case histories are used which graphically tell the story of these two alloys and their possibilities. Sil-Fos, the low temperature silver brazing alloy for non-ferrous metals, is used by a manufacturer of refrigeration coil units to make joints which withstand pressures up to 3,000 PSI. This publication is available from HANDY & HARMAN, Dept. TDJ, 82 Fulton St., New York 7, N. Y.
Inform-A-Gram No. B14.

CINCINNATI UTILITY SHAPERS, which are handy machines of a small size that still retain all of the essential refinements of the larger shapers, are offered in new descriptive literature from The Cincinnati Shaper Company. Dimensions and specifications for these shapers, available in 16" and 20" stroke sizes, are listed. They can be equipped with either a three or five hp motor drive. This literature may be had by writing to THE CINCINNATI SHAPER CO., Dept. TDJ, Cincinnati 25, Ohio.
Inform-A-Gram No. B15.

FLEXOLAPS, which are instantly and accurately adjustable for fast cutting and polishing without danger of galling or seizing, are the subject of a colorful new folder from Flexolap Manufacturing Company, Division of Federal Tool Corporation. The Flexolap barrel is made with a series of longitudinal slots milled off-center to permit sensitively flexible expansion up to 15% or more, under pressure of the adjusting pin. With a complete set of 15 Flexolaps, any hole from 3/16" to ¾" can be lapped. Midget Laps, for lapping holes smaller than 3/16", are also described in this folder. Address requests to FLEXOLAP MFG. CO., DIV. OF FEDERAL TOOL CORP., 4554 Broadway, Chicago 40, Illinois.
Inform-A-Gram Key No. B16.

CARBIDE-INSERTED DRILL JIG BUSHINGS are offered in a catalog just off the press of W. F. Meyers Company. MEYCO bushings are made of hardened alloy steel and have two carbide rings inserted at the maximum points of wear, thus combining the best features of steel and carbide—the protection of steel, with the long life of the carbide. These bushings are made to the dimensional standards of A. S. A. and may be used immediately, without changes in drafting room or tool design. This catalog on cost-saving MEYCO bushings may be had by addressing W. F. MEYERS CO., 1017 14th St., Bedford, Indiana.
Inform-A-Gram No. B17.

FIXTURE CLAMPS. Full scale template drawings of typical fixture clamps are presented for easy tracing in a set of 66 loose leaf pages offered by West Point Manufacturing Company. Clamp assemblies, hook clamps, swing clamps, clamp rests and straps, fixture keys, flatted locating pins and many other pieces are included. To obtain a copy of this publication, write to WEST POINT MFG. CO., 19627 Merriman Court, Farmington, Michigan.
Inform-A-Gram No. B18.

THE NEW JOHNSON 90 TON INCLINABLE POWER PRESS is the subject of a new descriptive bulletin from Johnson Machine and Press Corporation. This press, No. 8, is big enough to handle heavy work and long runs. One of the many features is the patented non-repeating safety clutch. It is a positive non-repeat mechanism. If one of the two activating springs break, the other spring operates the trip. If both should break, the clutch automatically disengages. This bulletin lists complete specifications for the No. 8, which is part of the full line of inclinable power presses with capacities from 16 to 90 tons manufactured by the company. Write for Bulletin T-90 to JOHNSON MACHINE AND PRESS CORP., 620 W. Indiana Ave., Elkhart, Indiana.
Inform-A-Gram Key No. B19.

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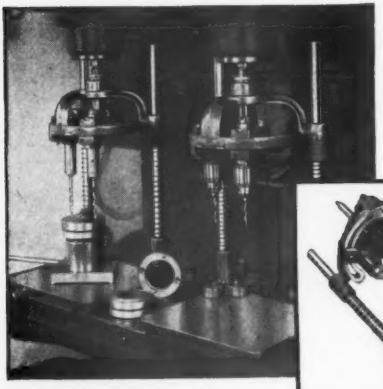
cutting edge and constantly sharp diamond.
Adaptable to all grinders. Simple to install.
Longer diamond life and more pieces
per dressing guaranteed.
Write for catalog.
J. K. SMIT & SONS, INC.
Gen'l Offices & Plant: MURRAY HILL, N. J.
6400 Tireman Ave., Detroit 4, Mich.
In Canada: 129 Adelaide St. West, Toronto, Ont.

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

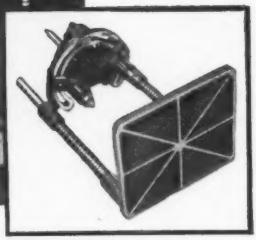
PUBLICATION PREVIEWS

MULTI-SLIDE MACHINES, MULTI-MILLERS AND AUTOMATIC PRESS ROOM EQUIPMENT are offered in the General Catalog of U. S. Tool Company, Inc. This is an illustrated 19-page booklet, which describes the complete line of U. S. equipment and machines. The U. S. Multi-Slide, a high speed automatic machine for the economical production of stampings from coil stock, is featured. This machine combines all of the operations usually accomplished by a battery of presses. Multi-Millers are cam-controlled machines which are designed for milling operations on small parts requiring extreme accuracy and intricate cuts. Other types of equipment included in this catalog are slide feeds, stock straighteners, roll feeds and automatic coil cradles. Write U. S. TOOL CO., INC., Dept. J, 255 N. 18th St., Ampere (East Orange), N. J.
Inform-A-Gram Key No. B20.

ATRAX CARBIDE BURS, for filing and finishing metal with speed, accuracy long life and low unit cost, are described in literature available from The Atrax Company. For use in high-speed portable tools, these burs are made from tungsten-carbide and machine-ground to precise uniformity. Continuous, uninterrupted flutes make for longer wear. Breaks and weak spots do not occur. Several sizes are pictured and their dimensions given. The company's carbide grinding tools are also included in this literature. Two enlightening case histories of the tools' uses are detailed. Address THE ATRAX CO., 240 Day St., Newington 11, Connecticut.
Inform-A-Gram Key No. B21.



Overarm Type has heavy guide pins, ground base 12 by 14 inches.



LINDERME 2-Spindle Head

"increased production from 160 to 600 an hour"

This story is typical of the many applications of Linderme 2-spindle drill heads on long and short runs. You'll like these features: drills, taps —in metal, wood, plastics; quick, accurate adjustment, ½" to 6" centers; two minute set-up on most drill presses in your shop; anti-friction bearings, rugged gearing, quality machining—and Linderme's low initial cost for Overarm or Sleeve Types —Twelve models, capacities up to ⅝", available with G.M. Sleeves or Morse Tapers. Write for complete catalog.

LINDERME MACHINE AND TOOL CO., INC.

12250 COYLE AVE. • DETROIT 27, MICH.

PRECISION MICROMETERS are featured in newly published Bulletin "T J", a handy-size catalog from The L. S. Starrett Company. Besides micrometers, this 17-page bulletin contains information and pictures of depth gages, sleeves, combination squares, combination sets, "oilgager" tape, plum bobs, dial test indicators, shock absorbing anvils, indicator hole attachments, out - of - roundness gages, hammers, wigglers (center finders), hole gages and pocket slide calipers available from the firm. For Booklet "T J", send requests to THE L. S. STARRETT CO., Athol, Mass.
Inform-A-Gram No. B22.

THE UNIVERSAL COLVISE, with drill column connection, will increase drill press safety and production. There are no dangerous "hold it by hand" short cuts. Instantly movable for drilling at any spot, this vise is described in a folder from Universal Vise & Tool Company, the manufacturer. Two models are detailed, both with maximum jaw openings of 6". For a free copy of this literature, write to UNIVERSAL VISE & TOOL CO., 33 Frank St., Parma, Michigan.
Inform-A-Gram No. B23.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

THE "E-CON-O-MILL". a standard face mill with replaceable carbide-tipped blades, is fully described in an 8-page supplement to Catalog No. 50 of The Gairing Tool Company. Made in two types—cone and heavy duty—the E-Con-O-Mill is fitted with one size of blade and lock. By interchanging the tungsten carbide-tipped blades to suit the material to be cut, all cutter bodies may be equipped for cutting steel, cast iron and non-ferrous materials. New blades come finish-ground, ready to be put to work. They may be re-sharpened, one by one, on a carbide grinder. Blades may be removed by hand, without removing cutter body from machine. Write to THE GAIRING TOOL CO., 21227 Hoover Rd., Detroit 32, Michigan.

Inform-A-Gram Key No. B24.

CHUCK SLEEVES AND CHUCK NUTS, for replacement in Brown & Sharpe machines, are now being made by Balas Collet Manufacturing Company. This announcement is made in new literature from the company. These parts are an adjunct to the line of collets, feed fingers and pads made by the firm. They are available for immediate shipment from stock in a complete range of sizes from 00 to 22. These chuck sleeves and chuck nuts have the same specifications as those made by the manufacturer of the original equipment. BALAS COLLET MFG. CO., 1557 E. 27th St., Cleveland 14, Ohio.

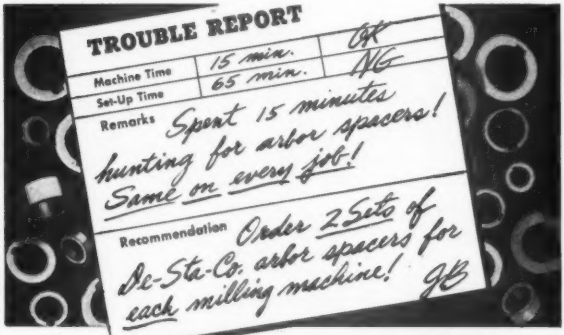
Inform-A-Gram No. B25.

TAPER BRIDGE REAMERS are the subject of a brief catalog supplement recently issued by National Twist Drill & Tool Company. These reamers are pictured and described as to price and specifications. For use in pneumatic tools for boiler, bridge, ship and structural iron work, these reamers are available in long and short sets. Straight and spiral flutes are included. Write NATIONAL TWIST DRILL & TOOL CO., Dept. R, Rochester, Michigan.

Inform-A-Gram No. B26.

STEP DRILLS, readily applicable to any machining operation, are the subject of a current card from Spiral Step Tool Company. This publication illustrates how the company's step drills, which are made from ordinary twist drills, can do precision jobs better than expensive, multi-fluted, special form reamers and drills. One page depicts the Spiral Method of machining a multi-diameter hole along with the usual, time-consuming method. Another page pictures typical applications of Spiral Step Tools in screw machines and drill presses. These include drilling, tapping, counterboring, countersinking, and chamfering. Write for this new literature to SPIRAL STEP TOOL CO., 1523 N. Fremont Ave., Chicago 22, Illinois.

Inform-A-Gram Key No. B27.



That's Right!

When machinists waste time hunting for arbor spacers it costs you plenty! A money-saving solution is to provide an extra set of De-Sta-Co arbor spacers and shims for every milling machine in your shop. Demanded by name for over 30 years, they're the machinists' preference for spacing of cutters, saws and slitters, for shimming gears and bearings and for all machining set-ups. Two sets per machine will save set-up time on *your* jobs.

ARBOR SPACERS Keywayed

SHIMS Not Keywayed

De-Sta-Co *arbor spacers* come packed in standard sizes from ¾" to 4" I.D., thicknesses from .001" to .125", all *with keyway*. Handy cellophane envelope contains set of 19 graduated decimal thicknesses. *Shims* supplied in same sizes *without keyway*. Specials, thicknesses over .125", available in popular sizes, machined from bar stock, hardened and ground, with standard keyways. Order De-Sta-Co arbor spacers and shims from your mill supply house.

DETROIT STAMPING COMPANY
344 Midland Avenue • Detroit 3, Michigan

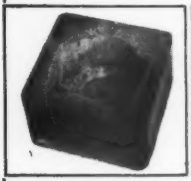
SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

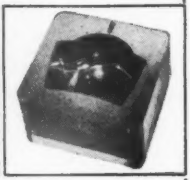
SMASH!
HEAT TREATING PROBLEMS
SLASH!
HEAT TREATING COSTS

with... PHOENIX BRAND
TRADE MARK REG. U.S. PAT. OFF.

NON SCALING COMPOUND

Originally produced for use in Parker's own plant to prevent scale formation and decarburization during heat treatment of tools and dies, PHOENIX BRAND NON-SCALING COMPOUND proved so successful it is now being offered commercially to industry. *Not a salt solution* but a specially compounded powder for use in hardening and annealing of steels—tested and proven in hundreds of hardening rooms. PHOENIX BRAND NON-SCALING COMPOUND pays its way in time and money saved. Obtain increased furnace capacity and production! Recommended for steels hardening up to 1750° F. *and for use in all furnaces except bath type.* TRY IT . . . discover for yourself the amazing results obtained in time and money saved using PHOENIX BRAND NON-SCALING COMPOUND.





This can be prevented! Note scale, pitting and decarburization . . . a result of normal heat treating. Time can be saved, furnace production increased, costly polishing after heat treating can be virtually eliminated.

This unretouched photo shows clean, smooth surface after heat treating using PHOENIX BRAND NON-SCALING COMPOUND. You too can benefit in time and money saved. Eliminate scale, pitting and decarburization.

ORDER FROM YOUR MILL SUPPLIER OR WRITE TO ADDRESS BELOW:

A Product of:

Parker

THE PARKER STAMP WORKS, Inc.
Established 1871
HARTFORD, CONNECTICUT

CADILLAC MARKING DEVICES are offered in an attractive, 40-page catalog from Cadillac Stamp Company. Some of the useful stamps and machines manufactured by the company are the following: steel trademark stamps, symbol hammers and hand stamps, the Cadillac Hydraulic Marking Machine and the "Automark" and stamping numbering heads. The "Automark" is an automatic marking machine which does fast, low-cost marking on light and medium-heavy parts. As many as 4000 parts have been automatically stamped in one hour by this machine. Accurate positioning governs tripping device which insures accuracy. Work must be in position to close the automatic control which releases the stamping ram. Maximum safety is thus assured. CADILLAC STAMP CO., 2136 Riopelle St., Detroit 7, Michigan.
Inform-A-Gram Key No. B31.

ROLLER DIES AND ROLL FORMING MACHINES are featured in a new series of illustrated, loose leaf sheets from American Roller Die Corporation. Eight types of roll forming machines are pictured and described as to dimensions and specifications. Shapes that are representative of the work being done on these ARDCOR machines are shown with each type. An example showing the sequence of operations required for roll-forming of a typical section is given. Also included in these sheets are the firm's adjustable Cradle Reel for easier loading and feeding of coil stock, the Flying Tube Cut-Off Machine, the Flying Saw Cut-Off Machine, the Flying Shear Cut-Off Machine, the Vertical Trimming and Beading Machine and the Heavy-Duty Hydraulic Beading Machine. Write AMERICAN ROLLER DIE CORP., 20550 St. Clair Ave., Cleveland 17, Ohio.
Inform-A-Gram Key No. B32.

No. 1 GEAR HOBBER, manufactured by The Hamilton Tool Company, hobs spur, spiral and bevel gears and like parts with a high degree of precision. Described in a new bulletin from the firm, this accurate machine sometimes achieves as much as three times the production accomplished on other machines doing the same class of work. Special characteristics in the hobber's design reduce setup time far below what is usually considered minimum, thus fitting it to the needs of the job shop as well as the shop having long runs. This bulletin contains photographs of the precision gear types now being hobbed by The Hamilton No. 1 Gear Hobber. Dimensions and specifications are also included in this bulletin, No. H 1-49. It is available from THE HAMILTON TOOL CO., 832 S. Ninth St., Hamilton, Ohio.
Inform-A-Gram Key No. B33.

"HI-SPEED-IT", the steel hardening compound recently developed by Wilson Carbon Company, is fully described in literature from the company. This compound makes it possible to harden drills, reamers, dies, taps, any carbon or high speed steel to the desired depth in a matter of minutes. In a recent test, a 3/16" carbon drill was hardened with "Hi-Speed-It" in 32 seconds flat and drilled a clean hole in a ¼" thick piece of 25 chrome —20 nickel steel. Outstanding among the compound's many advantages is the fact that "Hi-Speed-It" contains no cyanide or other producers of toxic fumes. The hardening process is simple and no special skill nor special equipment is needed. This literature is available from WILSON CARBON CO., INC., Dept. C-4A, 60 E. 42nd St., New York 17, N. Y.

Inform-A-Gram Key No. B34.

EXTERNAL OR INTERNAL THREAD CHASING can be accomplished by an ordinary machine operator with the "Meritool", sold by The Motch & Merryweather Machinery Company. This attachment, which can make any lathe a precision thread cutting machine in 10 minutes, is described and illustrated in a new brochure. Once "Meritool" is set up on a machine, an ordinary operator can chase precision threads—any type, any class, any pitch (within the range of the lathe's gearing). THE MOTCH & MERRYWEATHER MACHINERY CO., 715 Penton Building, Cleveland, Ohio.

Inform-A-Gram No. B35.

50 GRINDERS AND THEIR ACCESSORIES, which make up the complete line of Hanchett Manufacturing Company, are discussed and illustrated in the firm's new, 19-page Catalog, No. 190. The vertical spindle plano grinder, particularly suited to grinding large dies, hot press plates and similar surfaces of very large area or length to .005", is featured. Write to HANCHETT MANUFACTURING CO., 906 N. State St., Big Rapids, Mich.

Inform-A-Gram No. B36.

INSTANT ACTION VISES, which proved highly superior to ordinary vises in a study made at Industrial Engineering College, Chicago, are described and pictured in new literature received from Hartmann Manufacturing Company. The "Rapidset" vises include two bench type units, one with 3" jaw and the other with 4½" jaw. The larger features reversible jaws—smooth on one side, serrated on the other. Design and construction eliminate jaw cocking and distortion when work is locked in position. Other "Rapidset" vises are all-purpose toolroom units and make ideal, inexpensive bases for jig and fixture installations. The "Jawset", an adjustable pressure production vise, can handle millions of pieces after jaw is set in position. HARTMANN MFG. CO., Dept. 300, 1600 Junction Ave., Racine, Wis.

Inform-A-Gram Key No. B37.

when you think of **BORING**
think of **BOKUM**

The angle of the cutting edge and the special helical backed-off form of the front of the tool (that characterize Styles A and B) produce a free cutting action that is constantly retained—even through resharpening.

Bokum tools are always preferred where precision boring is demanded.

Send for complete catalog E 1139-6.

IN SETS... *at your finger tips*

Why waste your time and that of boring mill operators searching around for the required tool? Bokum Boring Tools are now available in boxed sets, made up in standard assortments to meet your needs.

Send for Supplement E 1139-6 giving full information.

TRADE MARK REG. U. S. PAT. OFF.
BOKUM TOOL CO.
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SINGLE POINT BORING TOOLS · INTERNAL THREADING, BOTTOMING AND FACING TOOLS · CARBIDE TIPPED TOOLS

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

Automatic Drilling Unit With Traversing Rotor

Automatic drilling units are usually made by detaching the head from a drill press, mounting it on a frame and providing a cam and air cylinder for actuating the stroke with a hydraulic check often used to control the feed.

To meet the need for this type of equipment, the Black Drill Co. is now producing a drilling unit with a traversing rotor in which the solid shaft, A, Figure 1, of the induction motor serves as the support for the working tool. To obtain the traverse for the required length of stroke, without using a splined shaft, the motor rotor, B, Figure 1, is designed to push partly out of the magnetic field as shown at C, Figure 1.

This is a radical departure from accepted practice but continuous tests disclosed that modifications in the motor structure eliminated the possibility of "burn out" and compensated for the loss of torque when the rotor was pushed out of the stator. The rotor shifts as much as one-third of its length with a maximum torque loss of 25%. Windings are provided for the required horsepower at the extreme position of the stroke.

The unit is composed basically of four members: an induction type motor; four-way air valve; double-acting air cylinder; and hydraulic check or "escapement". All parts are securely mounted on a common frame, with mechanical linkage between the air and hydraulic members to avoid the possibility of air leaking into the hydraulic chamber.

The motor shaft, A, Figure 1, which carries the rotor is the only part of the entire unit that rotates. Traversing is obtained from a simple double-acting air cylinder, D, Figure 1. The non-rotating air cylinder shaft engages the rotating motor shaft through a thrust bearing housing, E, Figure 1. A double-row antifriction bearing takes up both radial and direct thrust loads from the rotating motor shaft.

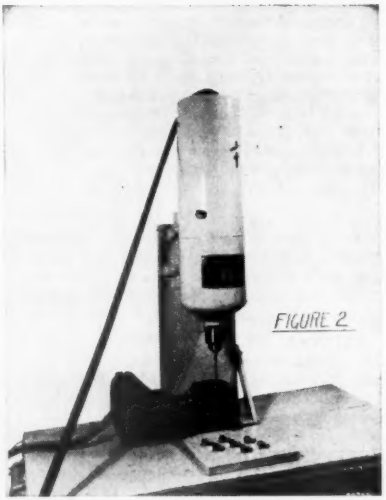
FIGURE 2

A typical application of this drilling unit is shown in Figure 2. This is a simple setup using the unit in a vertical position for drilling small forged parts, held in an air-vise.

Further details may be had by writing Black Drill Co., 1368 E. 222nd St., Cleveland 17, Ohio. **Inform-A-Gram Key No. D12.**

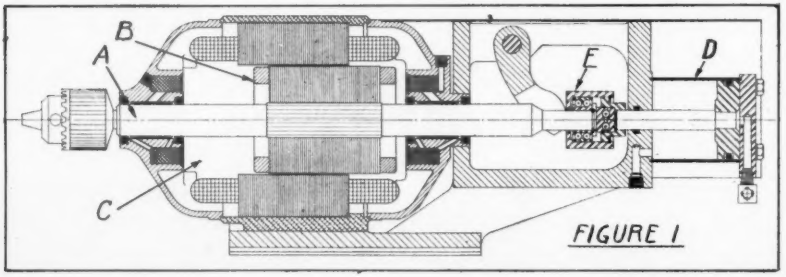

FIGURE 1

Peaslee
ENGRAVERS' CUTTERS

These are close tolerance cutters for use on high speed Milling Machines, Duplicators and Pantographs. Flats are ground from .0005 to .001 above center to cut your sharpening time and costs. Made from tough, wear-resistant steel; points and cutting edges stay sharp longer.

Our cutters are offered in two types of steel; "Red Label" for use on brass, bronze and non-ferrous materials; "Green Label" for roughing and heavy cuts on steel and ferrous materials.

Offered in taper shank single end, and straight shank single and double end; square, round and conical nose patterns. Write for Bulletin C-10.

Illustrated actual size; taper shank, single flute, conical nose cutter.

PEASLEE METAL PRODUCTS CO.
470 Tolland St., East Hartford 8, Conn.

COOLEY
ELECTRIC HEAT TREATING FURNACES

- A Complete Service
- 14 Models—Bench Type Muffle—Industrial Box—Air Draw
  Sizes from 8"x6"x14" to 12"x8"x36"
- Pot Furnaces for lead and salt

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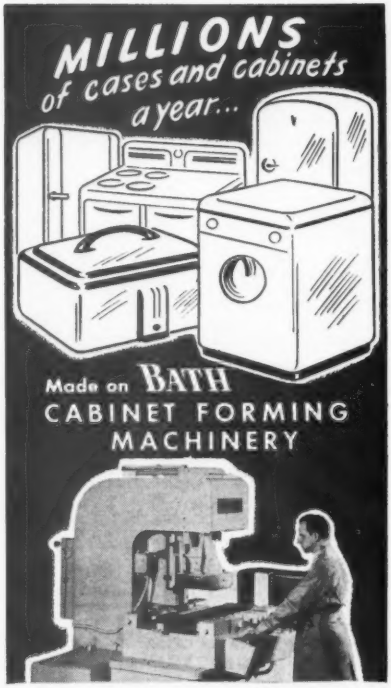

BATH machines have completely revolutionized cabinet forming by eliminating costly conventional manufacturing methods. A single cycle of operations forms outer shell in one piece. No wrinkling—no costly hand finishing—lower unit production costs for you. Available for modest or large production, fully or semi-automatic. Ideal for forming cabinets, shrouds, cases, boxes, bases and liners for:

REFRIGERATORS KITCHEN CABINETS RADIOS
WASHING MACHINES ELECTRIC ROASTERS TV SETS
VENDING MACHINES SPACE HEATERS IRONERS
ELECTRIC CONTROLS UNIT HEATERS STOVES, etc.

Send blueprints and advise production requirements—or write for catalog.

THE CYRIL BATH CO.
7037 Machinery Ave., Cleveland 3, Ohio

Design Engineers and Manufacturers of METAL FORMING EQUIPMENT

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

The PERFECT MACHINE for
FLAT, ROUND and CONTOUR MARKING

The Cadillac Hercules Hydraulic Marking Machine

From a "kiss" impression to the crushing force of 12,000 pounds pressure, the HERCULES will deliver an unfaltering flow of power for every conceivable marking requirement.

ONE CONTROL GIVES FULL RANGE OF MARKING DEPTH!

Motor and mechanism enclosed in streamlined housing.
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Hydraulic system by leading manufacturer with convenient servicing.

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★ – Fast Slide Return (Up to 110 1" strokes per minute)
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★ – Will Mark Any Shape (Flat, round or irregular pieces)
★ – Heavy Pressure Will Not Slow Down Cycle

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Write for Complete Details

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2135 Riopelle • Detroit 7, Michigan

CUT PRODUCTION COST . . .
DRILL WITH THE
"Speed-Right"
COMPACT AIR-FEED DRILL HEAD

.004" to 5/32" from $213.50

THESE EXCLUSIVE FEATURES WILL REALLY SAVE YOU $$$ . . .
- FINGERTIP VARIABLE SPEED
- FAST APPROACH AIR FEED
- HYDRAULIC FEED ADJUSTMENT
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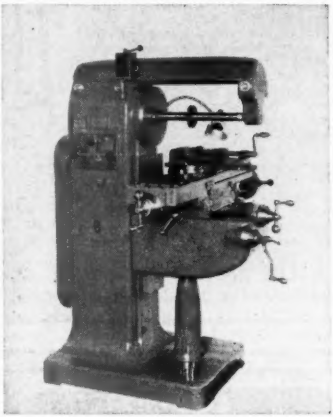
- DEEP HOLE DRILL CLEANING
- 1000-10000, 2500-15000 RPM.

Write for *Five Steps to Better Drilling*

THE ELECTRO-MECHANO CO.
261 EAST ERIE STREET
Milwaukee 2, Wisconsin

New Index Horizontal Milling Machine

This newly designed horizontal mill, of full No. 1 capacity, has the precision of a toolroom machine plus the ease and simplicity of operation required for high production. The 40″ x 9″ standard table has a working surface 32″ x 9″. The table feeds are: longitudinal, 26″; transverse, 9″; and vertical, 16″. Arbors accommodated are: Type A, 15″; Type B,



18″, and Type C. Face mills bolt directly to spindle nose. Cutters up to 11½″ diameter may be used.

All controls are most convenient to the operator. Eight spindle speeds, 50 to 1000 rpm, are selected by simple shift levers, which interlock to prevent gear damage. The six, longitudinal, table feeds are instantly reversible without stopping spindle or motor, and positive stops in either direction are provided.

Contributing to both precision and long life under severe usage are the ground thread lead screws, the extra-wide saddle ways and the wide, massive knee.

The Index Machine & Tool Company, 541 N. Mechanic St., Jackson, Michigan, manufacturers also of two vertical Millers, will send detailed construction and operating information; or circle Inform-A-Gram Key No. D8.

1949 — It's New — 1949

[3] KUTMORE ADJUSTABLE HOLLOW MILLS, described in Catalog No. 20-TD issued by Carl Wirth & Son, Inc., reduce machine down time and increase production by means of micrometer adjustment for rapid setups.

[4] DRILLS, TOOL BITS AND SPECIAL TOOLS, made from "Hardsteel", are solving many production problems. Black Drill Company's "Hardsteel" Operators Manual explains fully the procedures to follow for best results.

[5] GAGES AND GAGING EQUIPMENT information is contained in Pratt & Whitney's Catalog No. 11. In this catalog a complete listing of all P & W gages and gaging equipment is made available.

[6] GAGE BLOCKS. A new catalog, containing detailed information and illustrations covering Johansson Gage Blocks and accessories, has been prepared by Brown & Sharpe Mfg. Co.

[7] ADJUSTABLE DIES. S. B. Whistler & Sons, Inc., have developed the new HU-50 units which pierce holes at 90° angles and can be used in conjunction with standard perforating equipment. These are described in the Whistler catalog.

[8] MILLING ATTACHMENT. Literature from Bemis & Call Company describes the Milmaster, an attachment "that converts one machine into a tool shop".

[9] MINIATURE VARIABLE-RATIO SPEED CHANGER, produced by the Metron Instrument Company, is described in Bulletin No. 99. Its operating principle, applications and design features are illustrated by dimensional drawings and characteristic curves.

[10] TAPPING COMPOUND. A bulletin announcing a new tapping compound has been issued by Cimcool Division, Cincinnati Milling Machine Co. This compound is a companion to Cimcool cutting fluid.

[11] MILLING MACHINE. Bulletin No. 60, from Index Machine Co., describes their No. 1 horizontal milling machine. It has the precision of a toolroom machine, but with capacity and ease of operation for production work.

[12] CHUCK SLEEVES AND CHUCK NUTS for replacement in Brown & Sharpe machines are listed in new literature by Balas Collet Mfg. Co. Shipments from stock are being made.

[13] MARKING DEVICES. A 40-page catalog from Cadillac Stamp Co. lists the trademark stamps, symbol hammers, hand stamps and other marking equipment made by this company.

[14] GEAR HOBBERS, for producing precision spur, spiral and bevel gears, gear sectors, spline shafts, pinions and worm gears, are described in a 4-page folder from Hamilton Tool Co.

[15] JIGS, FIXTURES AND CLAMPS produced by the Siewek Tool Company are profusely illustrated in a new catalog, No. 7. Photographs of actual operations show the completeness of the Siewek line.

[16] CAM PROFILER, operating automatically with high accuracy, has just been announced by George Gorton Machine Co. This profiler is a contour mill with rotary master, variable ratio and automatic cycling features.

[17] METAL MARKING by the electrolytic stencil etching process is described and illustrated in literature from The Lectroetch Company. No acids are used; therefore no dangerous destructive fumes are present.

[18] POLISHING AND BUFFING MACHINES. Four new, two spindle, manual indexed, semi-automatic polishing and buffing machines have recently been announced by Hammond Machinery Builders. Complete information is available.

[19] FORM AND CUT-OFF MACHINE. The Producto Machine Company announces the Bar-Matic, a 4-spindle, high speed production machine for external forming, grooving, beveling, chamfering and cutting-off of bar stock.

[20] COMBINATION SPOT AND ARC WELDER, called "The Dual Weld", has recently been placed on the market by the Delta Mfg. Div. of the Rockwell Mfg. Co. This is a 5 KVA spot welder and a portable 120 ampere arc welder.

[21] TOOL POST BOLTS for automatic screw machines, in three sizes, are an addition to the line of Boyar-Schultz S. M. B. bolts. They are extra tough and heads will not pull out under any ordinary use.

[22] BENDER FLOOR CABINET was developed by O'Neil-Irwin Mfg. Co. for mounting the Di-Acro bender. It provides convenient storage space for the various mandrels usually used with the bending machines.

[23] LATHES. New models of Springfield Engine and Toolroom Lathes have been announced by the Springfield Machine Tool Company. Special consideration has been given to the greater ease of operation, simplicity of design and rugged proportions.

[24] AIR LINE FILTER AND LUBRICATOR, built by the M-B Products, are designed to first remove pipe scale, moisture, and other impurities from the air line and then deliver into the air line any desired volume of oil.

	3	4	5	6	7
8	9	10	11	12	
13	14	15	16	17	
18	19	20	21	22	
23	24				

TOOL & DIE JOURNAL 1975 Lee Road Cleveland 18, Ohio

Gentlemen: We will appreciate receiving the indicated literature. 7

Name: _____ Title: _____

Company: _____

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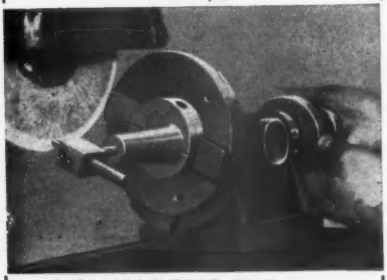

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Absolute precision with one setting for any two angles, as well as set radius. Especially adapted for angle tangent-to-radius wheel dressing.

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Steel Founders' Industrial Relations

A recent two-day conference of the Steel Founders' Society of America was devoted to such industrial relations subjects as: installation of work standards with incentive pay; sound job evaluation program; sound salary evaluation program; and creating methods for more intelligent negotiation of labor contracts. Harry L. Simmons, Personnel Director, Scullin Steel Co., St. Louis, Mo., is chairman of the Society's National Personnel Committee.

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A production jig manufactured to high precision tolerances. Self aligning and interchangeable jaws give easy visibility and plenty of chip room. ***Difficult jobs made easy.***

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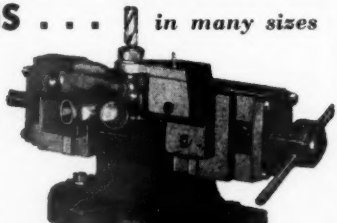

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TANGENT BENDERS—how they operate and what they produce—are featured in a 28-page bulletin just issued by Struthers Wells Corporation. Among the most popular and versatile of the extensive range of tangent benders treated is the Single Wing model, which itself is available in models from 3 to 10 hp and with width capacity from 34" to 120". This model will do any style tangent

bending—forming one corner at a time—and has production capacities ranging up to 175 sheet metal bends per hour. Other types included in this publication are the Double Wing and the Cam-Operated Double Wing models. This bulletin contains instructive information on the various applications of these machines and illustrates the styles of bends they produce. Two pages are devoted to the various tangent-bent flanges, including spherical ball corners and modified ball corners. The last section contains plant processing photos and a review of production facilities. For this highly informative bulletin, Catalog T-1210, address requests to STRUTHERS WELLS CORP., Davidson Ave., Titusville, Pa. **Inform-A-Gram Key No. C1.**

NEW CEMENTED CARBIDES CATALOG. Complete and up-to-date is the recently published Catalog 49 of Kennametal, Inc. This 76-page booklet includes many sections that will prove useful to tool designers and machine operators. They are: a detailed description of Kennametal compositions, including mechanical and physical properties, listed in chart form; how to design for best results from Kennametal, dealing with the problems presented by thermal expansion and modulus of elasticity; recommended grades and suggestions for cutting speeds on steel of different hardnesses; machining hints for steel, cast iron and non-ferrous materials; and tool wear analysis. This catalog, which is fully illustrated with diagrams, sketches and photographs, offers the fullest coverage to date on Kennametal cemented carbide tools. Boring tools, planer tools, Kennamills, centers, tool blanks and many others, are pictured and described. Specifications and prices are given. An interesting history of Kennametal can be found on pages 2 and 3. This attractively-covered catalog has a visual index which makes it extremely easy to use. To obtain a copy of Catalog 49, address requests to KENNAMETAL, INC., 500 Lloyd Ave., Latrobe, Pa. **Inform-A-Gram Key No. C2.**

"A FILM REPORT ON THE GENERATION OF METALLIC BEARING SURFACES" is a new 16 mm sound movie presented by Micromatic Hone Corporation. It is an analysis of bearing surfaces and the methods used in generating them. In preparing this film, the latest techniques in ultra high-speed, microscopic, photoelastic and Schlieren photography were used. Copies of this film may be obtained for showing before technical or trade organizations. An illustrated synopsis of the film may be had by writing to MICROMATIC HONE CORP., 8101 Schoolcraft Ave., Detroit 4, Michigan. **Inform-A-Gram Key No. C3.**

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

SHOP AIDS

AIR AND HYDRAULIC EQUIPMENT MAINTENANCE MANUAL. This pocket-size booklet, titled "The Facts of Life on Air and Hydraulic Devices", presents in a concise style the "Do's", "Don'ts" and "What to Look For" phases of setting up and servicing this type of equipment. Published by The Logansport Machine Company, Inc., this manual deals with air and hydraulic valves; air, hydraulic and airdraulic cylinders; hydraulic power units; lines and power chucks. Material for this publication was compiled specifically as a service to tool engineers, designers and maintenance men. Copies are available free by writing THE LOGANSPORT MACHINE CO., INC., 820 Center Ave., Logansport, Ind.
Inform-A-Gram Key No. C4.

MOLDING HEAVY SECTIONS IN ACRYLICS is discussed by W. E. Rahm, Plastics Technician, E. I. du Pont de Nemours & Co., in the latest issue of DME News, a monthly house organ published by Detroit Mold Engineering Company. Each issue is devoted to technical papers discussing various aspects of molding and mold making. Other news of the industry is included. DME News is available at no charge from DETROIT MOLD ENGINEERING CO., 6686 E. McNichols Rd., Detroit 12, Mich.
Inform-A-Gram Key No. C5.

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HANDBOOK: "SAFE SPEEDS FOR GRINDING WHEELS". This publication, just issued by the Grinding Wheel Institute, is a non-technical discussion of the established rules governing safe operating speeds and is prepared especially for the use of grinding machine operators, supervisors, safety engineers and others responsible for the control of grinding wheel speeds. It explains why it is important that the maximum operating speed recommended by the wheel manufacturer be not exceeded and points out that, in many cases, productivity of grinding machines actually increases when the wheel is operated at a speed well under this maximum operating speed. This handbook is divided into the following sections: Maximum Peripheral Speeds, Peripheral Speed and Revolutions Per Minute, Strength Classification of Grinding Wheels, Definition of "Maximum" Speeds, Effect of Wheel Speed on Grinding Action, Most Efficient Speed Usually a Safe Speed, Established Factor of Safety, True Factor of Safety, Wheel Manufacturer's Recommendation, Protection Hoods, Mounted Wheels and Points—Critical Speeds and Conversion Table, RPM to SFPM. For your copy of this valuable handbook, address GRINDING WHEEL INSTITUTE, Dept. TD, P. O. Box 64, Greendale, Mass.

Inform-A-Gram Key No. C6.

AIRCRAFT STEELS. A new, 64-page booklet, containing descriptions and lists of sizes, weights, lengths and extras of carbon, alloy and stainless grades of aircraft quality steel, available for immediate shipment from stock, has been published by Joseph T. Ryerson & Son, Inc. A helpful feature of the booklet is the condensed listing of AN-QQ, Federal QQ and AN and AMS specifications pertaining to steel. All of the steels listed are produced in strict accordance with Army-Navy Aeronautical Specifications and are tested and approved as suitable for the manufacture of aircraft parts. This new aircraft steels booklet is ready for insertion in a notebook and may be obtained by writing to JOSEPH T. RYERSON & SON, INC., Box 8000-A, Chicago 80, Illinois.

Inform-A-Gram Key No. C7.

"INDENTATION HARDNESS TESTING" is a 288-page book by Vincent E. Lysaght, Wilson Mechanical Instrument Co., New York. It covers the many problems involved in the hardness testing of metals and other materials and describes the instruments in most common use, as well as those used for specialized types of hardness tests. This useful and factual book is highly illustrated and can be purchased for $5.50 from the publisher, REINHOLD PUBLISHING CORP., Dept. MT-100, 330 W. 42nd St., New York, N. Y.

Inform-A-Gram Key No. C8.

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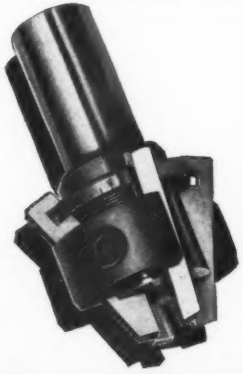
SAVES TIME and OPERATING COSTS



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SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

SHOP AIDS

HERE ARE THE ANSWERS to your questions on the design, construction and use of plastic molds.

Question: What are the requirements for mold designing?

Answer: Page 14, "Plastics Molds", by Gordon B. Thayer.

Question: How are inserts fastened in molded castings?

Answer: Page 16, "Plastics Molds", by Gordon B. Thayer.

Question: What type of steel should be used for making preform die parts?

Answer: Page 29, "Plastics Molds", by Thayer.

Question: When can non-ferrous metals be used for plastics molds?

Answer: Page 43, "Plastics Molds", by Thayer.

Question: Under what conditions is a split cavity mold used?

Answer: Page 59, "Plastics Molds", by Thayer.

Question: What advantages have the transfer type of mold; jet molding?

Answer: Page 71, "Plastics Molds", by Thayer.

Question: What methods are used in molding screw threads in plastics?

Answer: Page 169, "Plastics Molds", by Thayer.

Question: What are the advantages of hard chromium plating in the plastics industry?

Answer: Page 173, "Plastics Molds", by Thayer.

Question: How can time estimates be made for building plastics molds?

Answer: Page 223, "Plastics Molds", by Thayer.

Question: How can shrinkage in molded castings be determined?

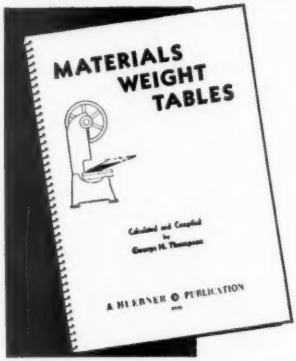
Answer: Page 253, "Plastics Molds", by Thayer.

The above questions and answers are indicative of the material contained in the revised third edition of "Plastics Molds" by Gordon B. Thayer. In addition, 13 pages are devoted to the nomenclature of plastics molding.

Copies can be purchased from HUEBNER PUBLICATIONS, 1975 Lee Rd., Cleveland 18, Ohio. $5.00 per copy, postpaid.

COMPUTING MATERIAL WEIGHTS is simplified by using Thompson's "Material Weight Tables". To determine the weight of 1000 pieces of steel 4" x 6 15/16" x .032", based on steel weighing .2836 lbs. per cubic inch, the conventional formula would be: Length x width x thickness x weight per cu. in. x 1000 equals 4 x 6 15/16 x .032 x .2836 x 1000 equals 251.8368 lbs. for 1000 pieces.

The Thompson weight tables are computed on the basis of a constant representing the area of the sheet x weight per cu. in. x 1000 pieces. This constant has been computed for every possible area from 1/16" x 1/16" to 12" x 12" in steps of 1/16". To solve this problem by using the weight tables method, it is only necessary to pick off the constant in the 6 15/16" column opposite the 4" dimension. This is 7869.90, which multiplied by .032"



(the thickness), equals 251.8368 pounds for 1000 pieces. Thus only one multiplication operation is required as against three for the conventional method.

Material weight tables, in terms of weight per inch and weight per foot, for round, square and hexagon bar stock, and for drill rod are also included.

Copies may be obtained from HUEBNER PUBLICATIONS, 1975 Lee Rd., Cleveland 18, Ohio. $2.50 per copy, postpaid.

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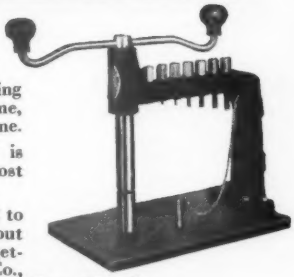
The Quick, Easy, Handy Way to TAP BY HAND

. . . Adapts for LATHE USE



The DAHLSTROM TAP GUIDE virtually eliminates tap breakage—and saves those costly hours spent prying broken taps out of dies. Saves time, too. Just a few turns of the handle and the job is done.

Winds through continuously, with no back-off. Work is always dependably straight and square. Fasten it to a post or set it on top of a big job.

This handy tapper comes equipped with 7 adaptors, 8/32 to ½", but taps are not furnished. Spindle can be pulled out and used in a lathe, or used as tap extension for hard-to-get-at-places. 13"x8"x14", wt. 32 lbs. Dahlstrom Mfg. Co., 2508 West Larpenteur Ave., St. Paul 8, Minn. *Send for Free Circular.*

Also Makers of Dahlstrom Autostop and Tap Chuck.

Dahlstrom TAP GUIDE

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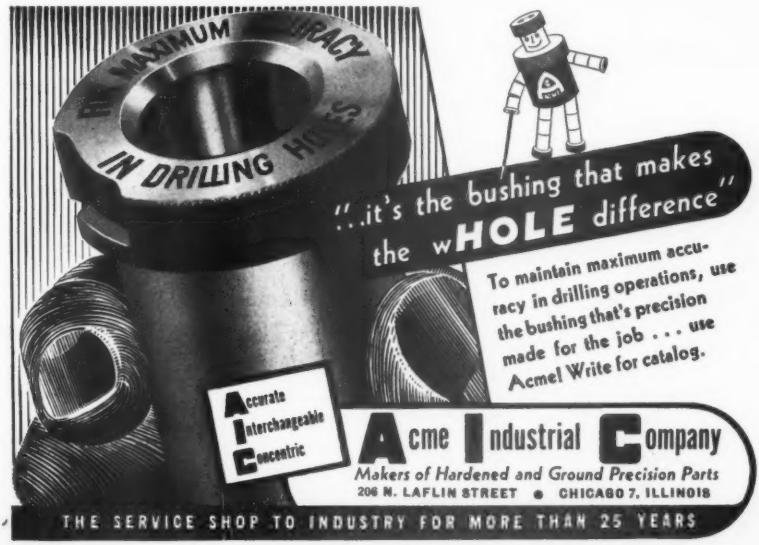
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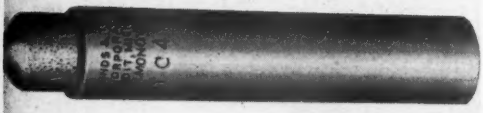
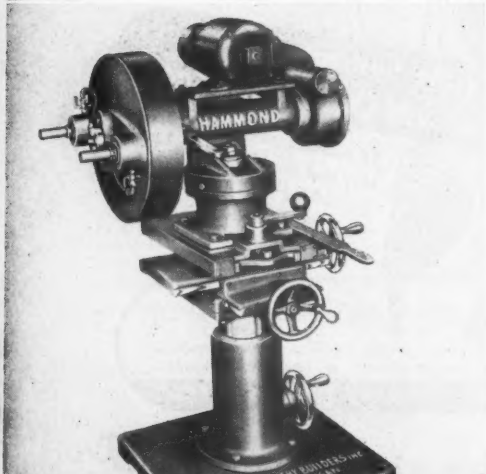
PROGRESS

NEW DEVELOPMENTS • IMPROVEMENTS • COST AND TIME SAVERS





CIRCLE KEY NUMBERS ON POSTAGE-FREE INFORM-A-GRAM INSERT FOR FURTHER INFORMATION

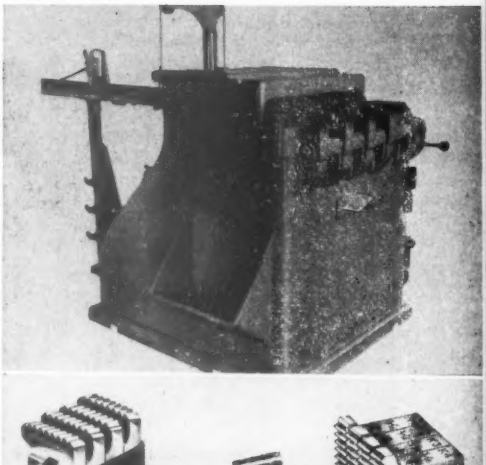
PRECISION BORING MACHINES, featuring new type controls, which permit instant selection of any one of three automatic cycles and convenient "inching" control for setting up, are being marketed by Covel Manufacturing Company. These electro-hydraulic controls offer quicker response to table and tooling movements, speeding up machine output. Accurate, high-production boring, turning and facing can be done on these new machines. Another innovation is the grouping of all push button stations in one inclined panel, for easier reach and vision of the operator. Cartridge-type spindles have permanently lubricated, pre-loaded bearings. Ways are provided with automatic lubrication and spindle motors are mounted above for convenient maintenance and shorter, more efficient "V" belt drives. The illustration shows the No. 51 single end model which is available along with other single and double end types. For full data write COVEL MFG. CO., Dept. TD-519, 280 Graham Ave., Benton Harbor, Michigan.
Inform-A-Gram Key No. A1.

ROUGH AND FINISH DRESSING or truing on surface, cylindrical or centerless grinders, can be accomplished by a new, universal diamond dressing tool developed by Diamonds and Tools, Inc. This tool, the IC-4, will perform economically on all bond hardnesses of either aluminum oxide or silicon carbide grinding wheels. It employs numerous small solid diamonds evenly distributed throughout a special Colmonoy wear resistant matrix. These small diamonds will always produce a sharp cutting edge because of their small cross-section. DIAMONDS AND TOOLS, INC., Dept. T.D., 19345 John R. St., Detroit 3, Michigan.
Inform-A-Gram Key No. A2.

A NEW GROUP OF SEMI-AUTOMATIC POLISHING AND BUFFING MACHINES has been announced by Hammond Machinery Builders, Inc. Designed to provide increased production and better finishes when used in conjunction with lathes or contour machines, these units can be used efficiently by inexperienced operators. Included in this new group are four two-spindle manual indexed machines. They are versatile in operation on such parts as hub caps, pots, pans, lamp bodies, towel rods, plumbing fixtures, etc. HAMMOND MACHINERY BUILDERS, INC., 1631 Douglas Ave., Kalamazoo 54, Mich.
Inform-A-Gram Key No. A3.

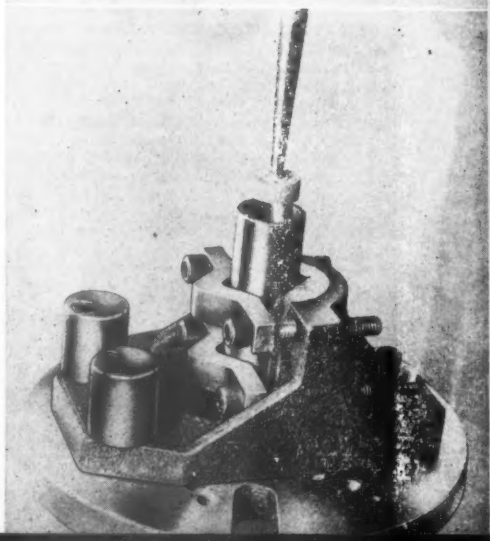
ON PARADE

THE BAR-MATIC, a new type, 4-spindle machine for high speed production of external forming, grooving, beveling, chamfering and cutting-off of bar stock, has been developed by the Producto Machine Company. The use of low air pressure is featured for feeding four 12 ft. bars simultaneously to four adjustable, positive stops. Four sets of forming and cut-off tools are mounted on a horizontal slide which is cam-operated longitudinally, assuring preservation of initial accuracy regardless of temperature conditions. Spindle speeds range from 900 to 2000 rpm. Cycle changes are instantly obtained by hand wheel control, without stopping the machine. Complete parts, formed and cut off, may be produced on the Bar-Matic at a rate of 1400 to 2400 pieces per hour with extreme accuracy. Capacity in diameter is ⅝" maximum, with cut-off length to 6⅝". For full details and literature, write to PRODUCTO MACHINE CO., 970 Housatonic Ave., Bridgeport, Conn.
Inform-A-Gram Key No. A4.



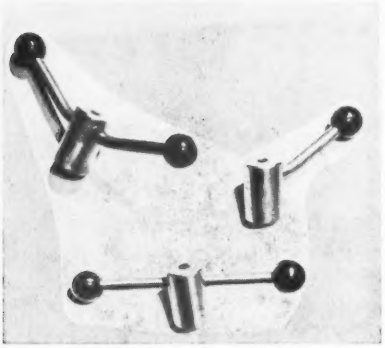
THE GEOMETRIC CHASER CLIP has been designed by The Geometric Tool Company to take the place of the former method of wiring. It provides a permanent and convenient way of holding the chasers together in a set before and after using. This spring steel clip is furnished as standard equipment with the company's Supermetric Chasers and will prevent the loss of individual chasers, avoid mixing with other sets, save chaser teeth from damage, make handling more convenient, simplify issue of chasers from tool crib and keep them together at all times. Write THE GEOMETRIC TOOL CO., Blake & Valley Sts., New Haven 15, Connecticut.
Inform-A-Gram Key No. A5.

A WORK-HOLDER, which provides quick, accurate setups on lathes, grinders, jig borers, milling machines and drill presses, has been patented by Lassy Tool Company. Made of fine quality, close grained cast iron, properly normalized to retain accuracy, this holder has counter-balancing weights with eccentric holes for fast, easy balancing. Guaranteed accuracy for the most exacting job is .0002 in 3". The round steel insert is hardened and ground; the "V", which has a recess for holding objects such as punches with heads, also has holes to accommodate work stops. Model R, pictured, has a capacity of ⅛" to 2". It is 7" long, 4½" wide x 3" high and weighs 8½ lbs. Write for additional information on this new work holder to LASSY TOOL CO., 96 Bohemia St., Plainville, Connecticut.
Inform-A-Gram Key No. A6.



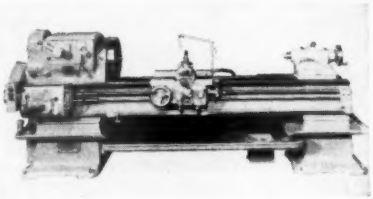
PROGRESS ON PARADE

A NEW TYPE, ALL-STEEL CLAMPING HANDLE is being manufactured by Reid Tool Supply Company. Greater strength and durability, without excess weight, is possible with this new type, which replaces the former cast iron handle. The body is made of heavy, cold-finished steel. Heavy one-piece steel handles, with plastic grasp knobs, are inserted in the body and held in position by a socket set screw. Smooth production finish does not require snagging and polishing. Drilling and



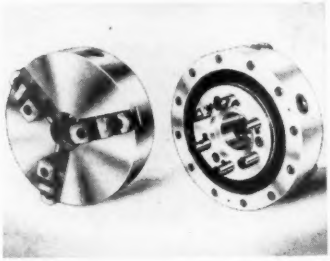
reaming or tapping is all that is required to mount these clamping handles on the job. They are available, as illustrated, in single or double-offset and straight types in several different sizes. REID TOOL SUPPLY CO., Dept. TDJ, Muskegon Heights, Mich.
Inform-A-Gram Key No. A7.

NEW MODELS OF LATHES manufactured by The Springfield Machine Tool Company have been announced in which special consideration has been given to greater ease of operation, simplicity of design and rugged proportions. These engine and toolroom lathes have 16 spindle speeds, increased horsepower capacities and several optional speed ranges, which give complete coverage for work requiring slow speeds for heavy cuts, as well as high speeds for carbide tooling. The simple three-lever gear shifting system is designed without any pass through gears and is therefore operated easily. An entirely new design of feed box incorporates lifetime lubri-



cated sealed ball bearings wherever possible. For detailed information and literature, write to THE SPRINGFIELD MACHINE TOOL CO., 631 W. Southern Ave., Springfield Ohio.
Inform-A-Gram Key No. A8.

A RUGGED NEW "WHITALOY" CHUCK has been placed on the market by Whiton Machine Company. The body of this chuck is forged of a special analysis, heat treated aluminum alloy, considerably reducing weight, which is of prime importance where high



spindle speeds are required. This facilitates quicker starts and stops and eliminates spindle drag. Another feature is the increased holding capacity of small spindle lathes through lighter spindle loads. The "Whitaloy" is adaptable to all spindle noses and is available in all sizes and types up to 15". WHITON MACHINE CO., 190 Pequot St., New London, Connecticut.
Inform-A-Gram Key No. A9.

ADVT.

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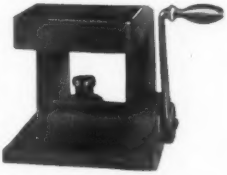
Four New, Small "C" TYPE DRILL JIGS. Two SPRING TYPE and Two RACK and PINION TYPE.

Siewek "C" Spring type jigs are particularly useful for odd shaped work requiring drilling, reaming, tapping or spot-facing. Central post location increases range of work. Sizes range from 3" x 3½" to 14" x 23½". Openings range from 2⅛" to 13" minimum and 2⅞" to 14½" maximum.



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The new Siewek Catalog (below) shows you how complete and inexhaustible is the selection of Siewek Drill Jigs, Fixture Clamps and Fixture Details.

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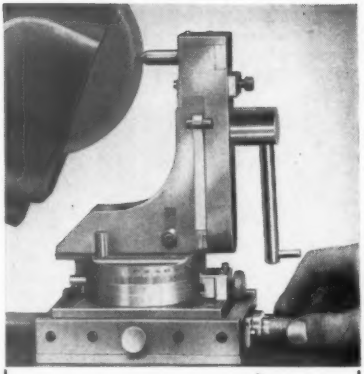

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Representatives in Principal Cities

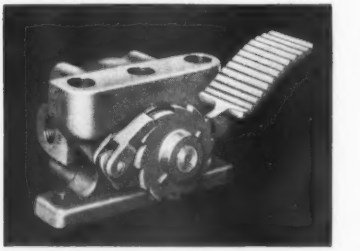
SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

PROGRESS ON PARADE

"THE DUAL WELD" is a combination spot and arc welder recently introduced by Delta Manufacturing Division, Rockwell Manufacturing Company. Besides selling for much less

than the total cost of two individual welders, the new combination welder takes less than half the floor space needed by the average 5-KVA spot welder plus the average 120-ampere arc welder. The Dual Weld unit spot welds, arc welds, solders and brazes. Its 10" throat depth permits spot welding to the center of a 20" sheet. A hand lever permits a simple and quick changeover from arc welding to spot welding. Write to DELTA MFG. CO., 600 E. Vienna Ave., Milwaukee 1, Wisconsin.
Inform-A-Gram Key No. A10.

NOPAK FOOT VALVE MODELS "F" AND "R" have been redesigned by Galland-Henning Manufacturing Company, with the principal change being the elimination of the internal exhaust core in the valve disc. This change results in larger, effective exhaust area, greatly increasing valve capacity and reducing the possibility of plugged passages. An incidental benefit is the fact that both the "cylinder" and "exhaust" ports are now located on the top, flat surface of the valve. The lower over-all height of the valves and the elimination of the side exhaust ports give them a more compact, streamlined appearance. Either of these models can be used as two-way shut-off valves or as three- or four-way operating valves. While both valves are designed primarily for air service, they may be adapted to oil or water-hydraulic service. For a more complete description and a presentation of the operating cycles, address GALLAND-HENNING MFG. CO., 2781 S. 31st St., Milwaukee 7, Wisconsin.
Inform-A-Gram Key No. A11.

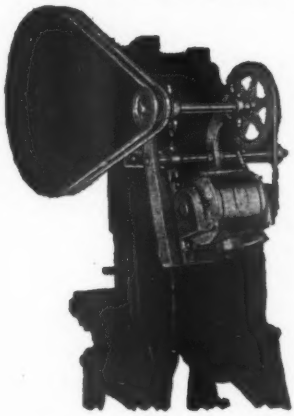


MOTORIZED HYDRAULIC BENCH PRESS. This new self-contained press, type "FM", is available in 5, 13, 18 and 20 ton capacities from Munton Manufacturing Company. It has a 3 hp, 220-440 volt, 3 phase, 60 cycle motor, hydraulic pump, valves and piping, all enclosed in the housing of the unit, instead of

in a separate floor cabinet. Ram has a 9" stroke. For details address MUNTON MFG. CO., Belmont Ave. and Soo R. R., Franklin Park, Illinois.
Inform-A-Gram Key No. A12.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

MODERN MOTOR DRIVE



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Utilize standard 1750 RPM motors.

No need to use slow speed or geared motors and small pulleys to slowdown your presses.

"V" Belt Drives absorb shock—operate smoothly—silently—efficiently—economically.

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MODERN MOTOR DRIVES DIVISION of
The Nichols Engineering Co. 2400 W. Madison St., Chicago 12, Ill.

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SOCKET HEAD CAP SCREW

Yes, these "UNBRAKO" Knurled Socket Head Cap Screws are real time savers because, the knurled head provides a "sure grip" even for oily, greasy fingers; therefore, the "UNBRAKO" can be screwed-in faster and farther before it becomes necessary to use a wrench. And, carefully controlled processing during manufacture assures Strength and Accuracy.

Knurling of Socket Screws originated with "Unbrako" in 1934.

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You can't tighten or loosen socket screws without a hex socket wrench, so why not get our No. 25 and No. 50 "HALLOWELL" Hollow Handle Key Kit which contains almost all hex bits.

Write for the name and address of your nearest "UNBRAKO" Industrial Distributor and your copy of the "UNBRAKO" Catalog.

Over 46 Years in Business — Kits: Pats. Pend.

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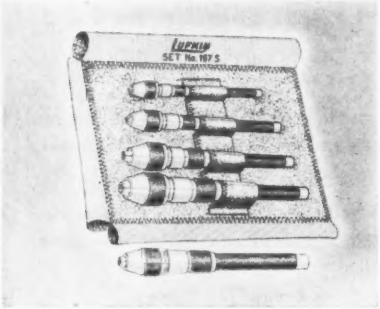
Chicago • Detroit • St. Louis • San Francisco

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

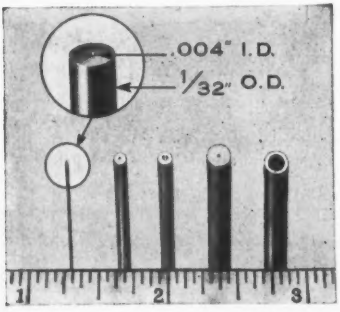
PROGRESS ON PARADE

PIN VISES, for holding small stock, or taps, drills, scribers and small files, have recently been brought out by Lufkin Rule Company. The complete set, No. 197S, in a leatherette case, is illustrated below, together with an individual pin vise. These well-proportioned



vises have hardened jaws and a hole running entirely through the handle affords the chuck a close-up grip, even on long rods. This hole will accommodate stock up to the full capacity of the vise. Also new to the Lufkin line are Small Hole Gages, which are ideal for measuring the diameter of a small hole or the width of a slot or groove that is below the 5/16" range of Lufkin Telescoping Gages No. 79AA. The size of the ball end is adjusted by turning the knurled knob at the opposite end of the gage, and the change in the size of the ball end is almost proportional to the movement of the knob, which greatly aids in getting the proper "feel" and setting. These gages are also available either as a set or individually. For full information and prices on these new tools, write LUFKIN RULE CO., Box 24, Saginaw, Michigan.
Inform-A-Gram Key No. A13.

EXTRUSION METHODS are now being used by Kennametal, Inc., to manufacture cemented carbide tubes as small as 1/32" OD, with an ID of .004", and as large as 9/16" OD, with a wall thickness of 1/16". The company's metallurgical engineers, who perfected these processes, say that even smaller or larger tubes and those having a greater range in relative dimensions, are also commercially possible. The OD is rough extruded .010" to .015" oversize, and the ID is held to 1% of specified size and accurately concentric. The ratio of ID to OD may cover a wide range, i. e., either a relatively thin or thick wall. These tubes can be supplied in either of two classes of Kennametal. They are straight tungsten carbide and titanium carbide. Write for further data to KENNAMETAL, INC., 500 Lloyd Ave., Latrobe, Pa.
Inform-A-Gram Key No. A14.



A NEW SECOND OPERATION MACHINE, with the addition of the air-operated collet feature to heighten speed, has been announced by Hardinge Brothers, Incorporated. All usual features of the present Hardinge line are also incorporated in this new machine. Because the air-operated collet will accurately

hold work without distortion, even though there is considerable variation in the chucking diameter from one piece of work to another, the machine is ideal for machining of automatic screw machine blanked parts, die castings or plastic moldings. The standard 5C Hardinge collet or step chuck may be instantly closed or opened when the spindle is at rest or at any speed to 4000 rpm. Write for full data on this High Speed Precision Second Operation Machine to HARDINGE BROTHERS, INC., Elmira, N. Y.
Inform-A-Gram Key No. A15.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

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OF KALAMAZOO

CARBIDE TOOL GRINDERS

Hammond offers a complete line of 7", 10" and 14" Carbide Tool Grinders either Wet or Dry — also Chip Breaker and Diamond Finishing Grinders.

Model WD-10 shown

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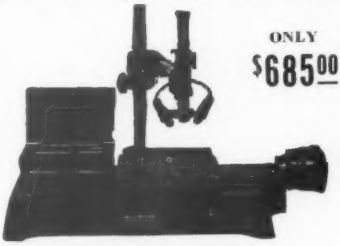
Toolmaker Microscope



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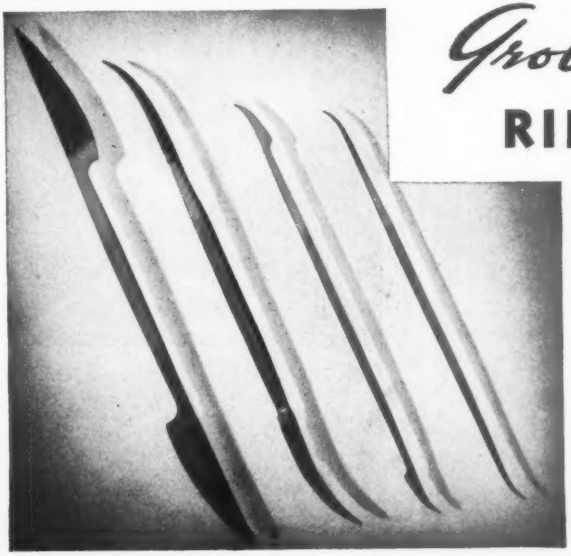

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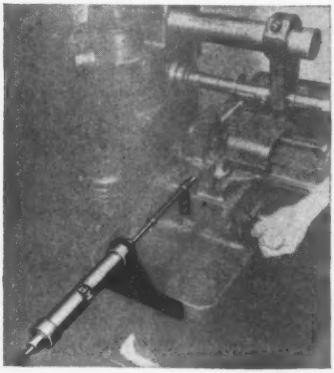
PROGRESS ON PARADE

"M-B" AUTOMATIC AIR LINE FILTERS AND LUBRICATORS are now set up in combination by M-B Products to provide the combined advantages of both. These units first remove from the air line pipe scale, moisture and other impurities which injure tools and equipment, then deliver into the air any desired volume of oil. Recommended for lubricating air valves, cylinders, controls, pneumatic tools, etc., this equipment is useful wherever clean, lubricated air is desired. An outstanding feature of the lubricator is the automatic Venturi Valve which permits a limited amount of air to be passed with efficient oil pickup. When necessary to pass a large volume of air, the valve automatically opens, allowing it to go through. For complete details, including dimensions and prices, write to M-B PRODUCTS, 132-134 E. Larned St., Detroit 26, Michigan.

Inform-A-Gram Key No. A16.

"POWER CHECK" PRECISION FEED CONTROLLER. This device, shown below being applied to a hand milling machine, may be employed to automatically retard speed and ease pressure at any or all points of feed-travel, when nose-mounted through a bracket attached to the moving element of any feeding mechanism. Now in regular production at National Pneumatic Company, the Power Check, if applied to pneumatic or manual drill press feed, can be adjusted to retard the drill during the whole operation, or to ease the drill through at only the breakthrough point, where most drill breakage occurs. In milling and grinding operations, it can be used to give a precision-controlled, uniform speed, to eliminate the destructive chatter and backlash that causes tool breakage. Complete information, including dimensions and price, is obtainable from NATIONAL PNEUMATIC CO., Industrial Division, Dept TDJ, Rahway, New Jersey.



Inform-A-Gram Key No. A-17.

A NEW AIR-DRIVEN BELT SANDER, adaptable for metal work on all types of surfaces, whether concave or convex, has been announced by Buckeye Tools Corporation. This sander is applicable to all types of metal finishes, both sheet metal and solid castings, and to all types of materials in iron, steel, brass, bronze, solder, aluminum and magnesium. It has been thoroughly tested in the automotive industry. For complete information on this newest addition to the company's Stream-Power line of portable air tools, address BUCKEYE TOOLS CORP., 27 W. Apple St., Dayton, Ohio.

Inform-A-Gram Key No. A18.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

West's Positive Automatic Stop For Dies

IMMEDIATE DELIVERY

SAVES MACHINE TIME & MATERIAL

Simple in Operation-Positive in Action-Easy to Install. Instructions for mounting included with Stop—PRICE $2.00

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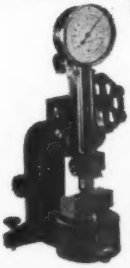

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CLARITE . . .
Standard 18-4-1 High Speed Steel.
Today's CLARITE is at its all-time quality peak. Full alloy content, close chemical and metallurgical tolerances.
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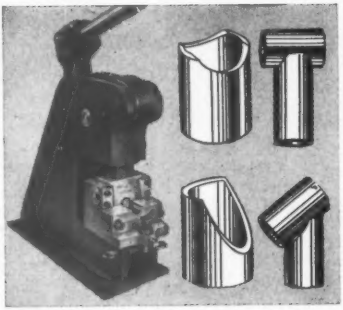
NOTCH TUBING and PIPING in 5 SECONDS on HAND or PUNCH PRESS with

ARC-FIT



Notches any size pipe or tubing without deforming. No grinding or finishing needed. Units furnished for one size of pipe or tube, with punches and dies easily changed for intermediate sizes within the range of the unit. Units for slotting operations, angular cuts or for square tubing are furnished to specifications. Std. pipe sizes ¾", 1", 1¼" and 2" carried in stock.

Write for details.

Prices on individual units, punches, and dies and on larger units quoted on request.

VOGEL TOOL & DIE CORP.

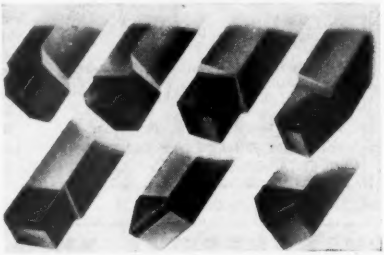
2527 Moffat Street
Chicago 47, Illinois

PROGRESS ON PARADE

BURGMASTER MODEL "B" is a new six-spindle, turret-type, automatic indexing, drilling and tapping machine, which replaces six machines on the production line. Made by Burg Tool Manufacturing Company, this latest model features: an 8" spindle travel; pre-selective spindle speeds, with a maximum of six different speeds per setup, enabling tools such as drills, reamers, etc., to operate at the

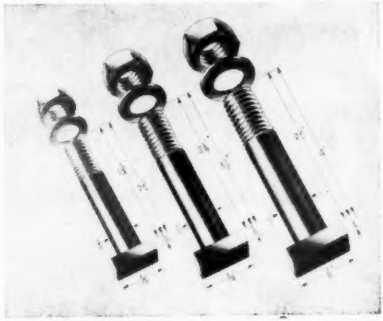
correct cutting speeds; large (15" x 21") table with "T" slots; and all sliding surfaces hand scraped to assure rigid and chatter-proof operations. Further information on the cost-cutting Burgmaster Model "B" may be obtained by writing BURG TOOL MFG. CO., Dept. T, 3473 Durango Ave., Los Angeles 34, Calif.
Inform-A-Gram Key No. A19.

CARBIDE-TIPPED TOOLS, in seven types for turning, boring, facing and threading, are now offered from stock by Super Tool Company. The line includes both left-hand and right-hand styles in side cutting types in a wide range of sizes. All tools are standard with optional grades of carbide for cutting steel or other materials. Other grades can be obtained upon request. For more complete information and descriptive bulletin, write



SUPER TOOL CO., 21654 Hoover Rd., Detroit 13, Michigan.
Inform-A-Gram Key No. A20.

TOOL POST BOLTS for automatic screw machines are an addition to the line of Boyar-Schultz Corporation S. M. B. Bolts and are made from high grade alloy steel, heat treated for maximum properties. They are extra tough and heads will not pull out under any ordinary use. Nuts are accurately made to



assure Class 3 fit with bolts. Washers are also accurately made, with bearing surfaces ground parallel. Cut shows sizes available for, left to right, Machine Nos. 00, 0 and 2. For full data write BOYAR-SCHULTZ CORP., 2112 Walnut St., Chicago 12, Illinois.
Inform-A-Gram Key No. A21.

Mr. Stamping Manufacturer: ADVT.

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Faster than a Slide Rule

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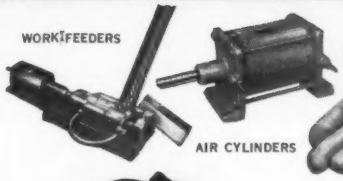

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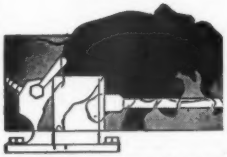
AIR CYLINDERS

MIDGET AIR CLAMPS

AIR PRESSES



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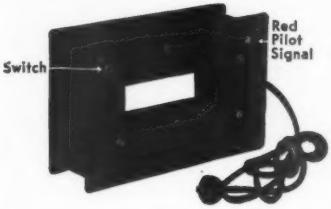

No shop or toolroom can afford to be without one. Thoroughness of the AMC Demagnetizer will give greater precision to finished parts.

One pass through AMC Demagnetizer removes all magnetism from processed parts. Large flat surfaces are demagnetized by sliding unit over surfaces.

● Our AMC Demagnetizer will pay for itself in a few weeks. Standard units available.

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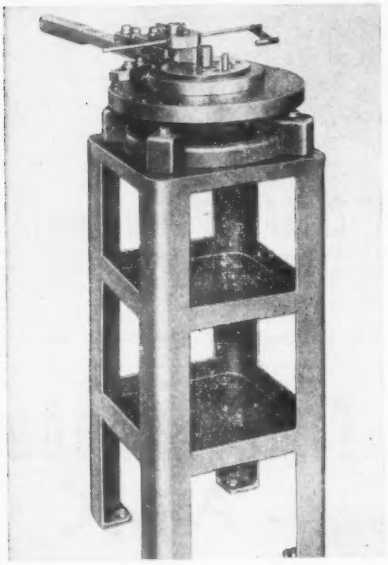
ALOFS MFG. CO.

1619 Madison Grand Rapids, Mich.

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

PROGRESS ON PARADE

A NEW FLOOR CABINET, especially designed to withstand the pressure to which it will be subjected in the bending of heavy materials, has been designed for mounting of the DI-ACRO Bender manufactured by O'Neil-Irwin Manufacturing Company. Although this machine is a bench mounted unit, heretofore a mounting pedestal has not been offered. Of welded steel construction, this cabinet weighs 90 lbs. The working height,



with the bender mounted as illustrated, is 38". Dimensions are 15" x 15" x 34". Two shelves built into this cabinet provide storage space for the various bending mandrels used with the machines. Either No. 2 (in cut) or No. 3 model bender can be mounted on this stand. O'NEIL-IRWIN MFG. CO., 315 Eighth Ave., Lake City, Minn.
Inform-A-Gram Key No. A22.

AN IMPROVED SHEAR, that cuts off flat strip stock with punch and die authority and precision, has been developed by The DoALL Company. This cam and lever actuated shear has been designed especially for quick square cutoff of saw blades for efficient welding into bands. It will take blades up to .045 thick and 1¼" in width. Previously, metal cutting snips have done this job, but their scissors action and inaccuracy due to slippage, bending or carelessness, resulted in deformed ends that curled up and were difficult to match

up for a successful weld. This new blade shear has a wider shearing surface and stays sharp longer, producing a smoother cut than is produced by snips. It has the added advantage of staying put, since it can be mounted on the saw or permanently mounted in a convenient location. For more information write THE DoALL CO., Dept. A-65, 254 No. Laurel St., Des Plaines, Illinois.
Inform-A-Gram Key No. A23.

THE TOOLMAKERS' WIGGLER, which can be used to locate holes accurately, is being manufactured by Glover Manufacturing Company. This tool makes it possible to line up the spindle of a machine so that a hole, cavity or slot can be located to a tolerance of less than one-half-thousandth of an inch, from any desired flat or round surface, in two or three minutes. The Wiggler is made in two parts that are held together by adjustable spring tension. A swivel is used in combination with the connecting spring so that the spring does not unwind. Made from the best grade of non-deforming tool steel and hardened to a Rockwell C62-64, this tool can be purchased in two different sizes—.200" and .250". For full information write GLOVER MFG. CO., 736 Mohican Place at Randolph Court, Dept. TDJ, Meadville, Pa.
Inform-A-Gram Key No. A24.

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For machinists, toolmakers, diemakers, model makers, template makers and layout men. With the use of this Layout Fluid you simply wipe the surface clean and brush it on. It dries instantly.

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35 YEARS OF DIE SET MAKING

THE DIE-SET AUTHORITY

All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

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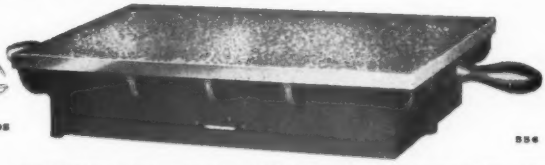

12 Sizes—3½x4 inches to 24x36 inches

BECAUSE:—THEY PRESENT ACCURATE UNYIELDING SURFACES AS MASTER PLATES FOR TESTING, TOOL MAKING AND INSPECTION

Precision-built of special analysis semi-steel castings, specially heat-treated to prevent distortion. Surface either hand-scraped or precision ground. Heavy diagonal ribbing the full depth of plate prevents sagging or yielding under load. Wood cover with all plates. All-steel electrically welded stands, portable or stationary are available. Write now for latest Challenge catalog.

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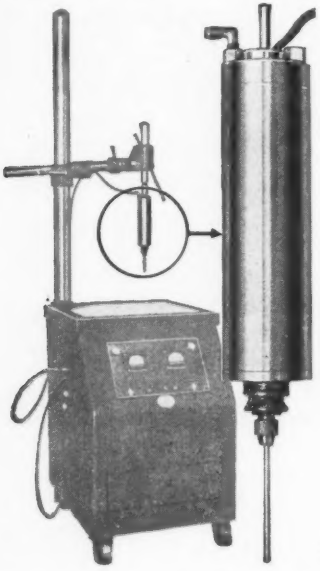
Challenge **THE CHALLENGE MACHINERY CO.**

GRAND HAVEN, MICHIGAN, U.S.A.

SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

PROGRESS ON PARADE

THE 1950 THOMAS METAL MASTER is a metal disintegrator, now in production at Clinton Machine Company, that has nine times greater cutting speed, actual die work cutting accuracy and new long-lasting and economy qualities. The Metal Master removes a ⅜" x ⅝" long broken tap in 60 seconds, cuts a .155 hole through ¼" Carboloy in five minutes,



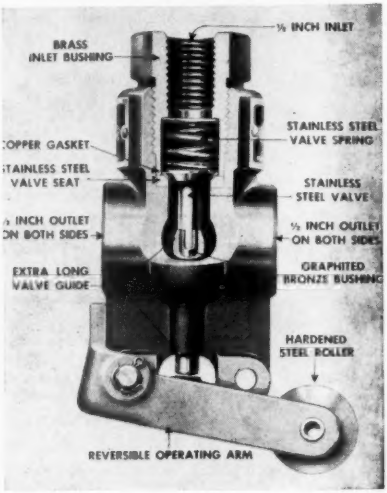
⅜" Stellite in 40 seconds and ¾" High Speed Steel in 60 seconds. A collet on this new model does away with the screw-type electrode and its inherent inaccuracies. CLINTON MACHINE CO., P. O. Box 72, Clinton, Mich.

Inform-A-Gram Key No. A25.

THE "DUSTKOP" DUST COLLECTOR is an entirely self-contained unit for collection of dust from swing grinders. This collector can be applied economically and quickly. A paddle wheel fan, driven by 1½ hp motor, develops a suction of 1400 cfm at the inlet. AGET-DETROIT CO., 305 Main at Washington Sts., Ann Arbor, Mich.

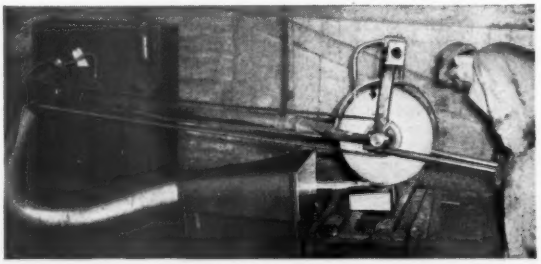
Inform-A-Gram Key No. A26.

AIR-SAVER AIR VALVES, which make possible greater tool efficiency because they remove metal chips and other scrap material quickly and cleanly, are offered by Palmer-



Shile Company. These valves may be mounted in any position to operate at any angle, unaffected by machine vibration. They are leakproof and designed to give split-second air control at all times. These valves are built into new machine tools or mounted on equipment already in operation. Used to increase tool efficiency in cleaning, drying, cooling, positioning and ejecting, Air-Savers have hundreds of applications around punch presses, die casting machinery, drill presses, and the like. They are also used extensively in reaming, broaching and similar operations. Write to PALMER-SHILE CO., 16021 Fullerton Ave., Detroit 27, Mich.

Inform-A-Gram Key No. A27.



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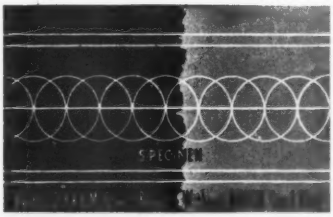
"M·B" Model U-TR
UTILITY Pneumatic
GRINDER
60,000 RPM

A powerful, fast-cutting tool, streamlined in design, easy to handle. Designed for real production work and the toughest jobs. Speed to operate Tungsten-Carbide Burrs, Rotary Files, etc., to full efficiency. Precision-made, excellent balance. Special grease-sealed bearings . . . no lubrication required. Fitted with steel housing, a special safety feature.

Also other Grinders and Automatic Air Line Filters and Lubricators. *Write for Literature.*

M·B PRODUCTS
130-134 E. LARNED STREET
Detroit 26, Michigan



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STOPS LOSSES
making dies and templates

Simply brush on; ready for the layout in a few minutes. The dark blue background makes the layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

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FASTER CUTTING
LONGER LASTING BLADE?
STAR MAKES IT!

No matter what type material you're cutting . . . metal, or non-metallic . . . you'll find Star blades cut it cleaner, faster . . . give longer, more economical service. That's because Star blades are made of the finest high grade steel, heat treated for extra blade strength. Teeth are precision-set to assure fast cutting and full side clearance. These Star features mean fewer "time-outs" on the job . . . greater cutting economy for you. And the Star line is *complete*. There's a Star blade designed for every cutting job a hack saw or band saw can do.

Next time your supplier calls ask him for a free copy of Star's booklet, "Metal Cutting", and the new Star Wall Chart. Both are packed full of valuable information on the selection, use and care of hack saw equipment.

CLEMSON
BROS., INC. • Middletown, N. Y.
Makers of hand and power hack saw blades, frames, metal cutting band saw blades and the Clemson Lawn Machine.

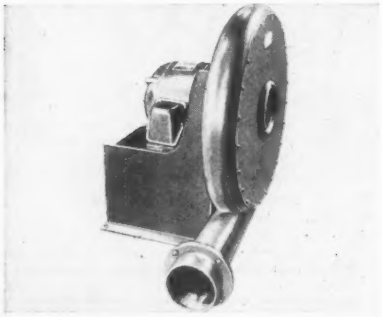
SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

PROGRESS ON PARADE

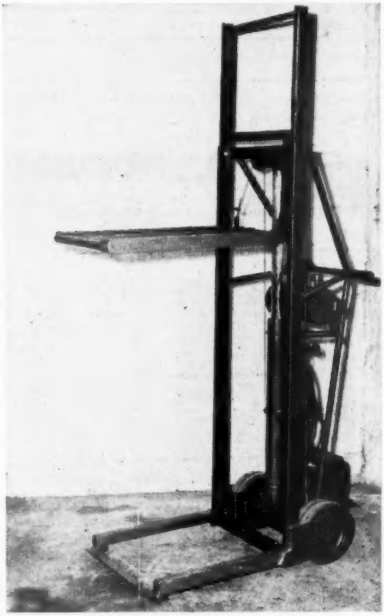
THE No. 2-20 MILLING MACHINE, manufactured by Kent-Owens Machine Company, has been equipped with a hydraulically controlled rotary table 16" in diameter, which replaces the standard table. This new table is driven

by means of a gear and rack which is mounted at the rear of the fixture. The rack is actuated by a hydraulic cylinder. The desired cycle can be obtained by placing the dogs in the proper position on the outside of the table. The machine has 12 spindle speeds, ranging from 64 rpm to 860 rpm. Write for complete information to KENT-OWENS MACHINE CO., 958 Wall St., Toledo, Ohio.
Inform-A-Gram Key No. A28.

SINGLE-STAGE, CENTRIFUGAL BLOWERS, in a new and improved line, have been developed by Lindberg Engineering Company. These Lindberg-Fisher Blowers feature full 360 degree positioning of the air outlet. This makes them easy to install or adjust in a hurry and eliminates pipe cutting, welding and extra piping. Belt-driven blowers in this line have been designed to utilize approximately one-half the floor space which is normally required by the conventional type belt-driven blowers. For dimensions, specifications and other details on these cost-cutting blowers, write LINDBERG ENGINEERING CO., 2444 W. Hubbard St., Chicago 12, Ill.
Inform-A-Gram Key No. A29.



THE ELECTROLIFT is a recently developed, light weight industrial lift truck, with a capability of handling 1000 lbs. to any level up to 48" from the ground. This unit was designed by Aeromotive Manufacturing Company for small shops or departments and also for second floor shops where cost, weight or space may be a deciding factor in discouraging the use of a larger power unit. The



Electrolift is operated by a self-contained hydro-electric system, powered with an ordinary automotive 6 volt battery, which takes care of the carriage lift and elevating action. Basically an elevator, the machine can also be used to transport material and dies around the shop. For complete dimensions, price, etc., write to AEROMOTIVE MFG. CO., 2807 N. Broadway, Wichita 4, Kansas.
Inform-A-Gram Key No. A30.

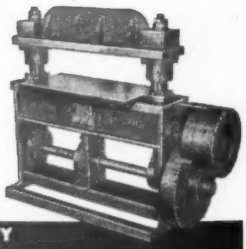
PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

DIAMOND

Multi-Max Punch Presses

EXCEPTIONALLY
LARGE BED AND RAM AREAS

CAPACITY 30 TONS



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3423 EAST OLYMPIC BLVD., LOS ANGELES 23, CALIF.
OFFICE AND WAREHOUSE IN CHICAGO

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BY A QUICK, EASY, INEXPENSIVE METHOD
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Wilmerding, Penna.

Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from #6 to ⅜" U.S.S. Inexpensive—Last for years. Write for Circular.

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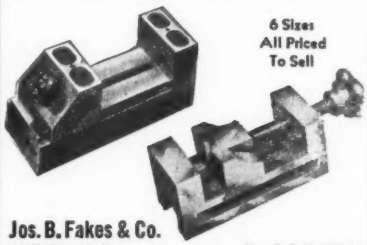

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All Priced
To Sell

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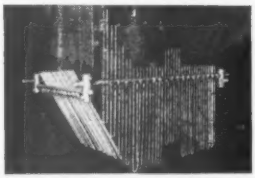
ADJUSTABLE ROD GUARD
for Power Presses



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MFGR. OF COMPLETE LINE OF PRESS GUARDS
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Efficiency

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STANDARD D-4 ABRASIVE BAND GRINDER

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36¼" band. The ideal portable unit!

Other styles and sizes in New Manual on finishing — Write today

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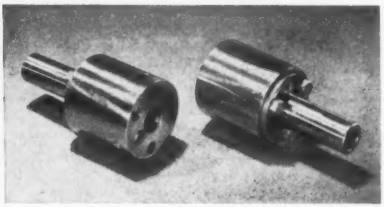
396 E. 38th Street — New York 16, N. Y

PROGRESS ON PARADE

A BRAND NEW TAP HOLDER, simple in design but extremely accurate, has been developed by Marcellus Manufacturing Company. Made to operate within .005", this tool has a hole all the way through it, so that only the absolute working part of the tap need be exposed. The rest can be shoved back into the holder. No need to break a new tap to fit the holder. If it should happen to break, the extra length of the tap is moved out, ground down and the tap is ready to operate again. The sensitive pawl is so calibrated that the moment the motor is reversed, the ratchet

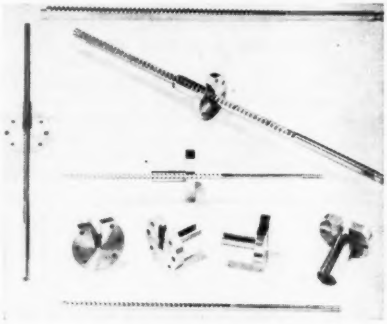


cannot ride more than a quarter turn before catching. It slips into place automatically. Both releasing and non-releasing tap holders in various sizes are now in manufacture. For details write MARCELLUS MFG. CO., Dept. TDJ, Belvidere, Illinois.
Inform-A-Gram Key No. A31.

NEW THERMO-GUARD GAGE BLOCKS, made by The Webber Gage Company, have

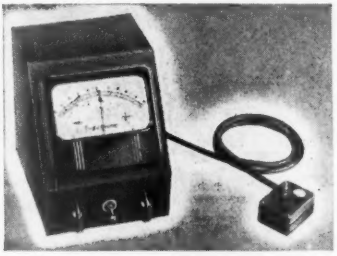
the unusual advantages of lowering the cost of carbide blocks and increasing the precision of steel blocks. Up until now, it has been necessary to allow blocks to "cool off" after handling and before making a critical inspection. The heat transmitted from the hands can cause an ordinary 4" steel block to grow .00005" in 15 seconds. To overcome this fault, Thermo-Guards are inlaid in all 2", 3" and 4" steel and carbide blocks, completely insulating them from the heat of the hand. For full particulars address THE WEBBER GAGE CO., 12903 Triskett Rd., Cleveland 11, Ohio.
Inform-A-Gram Key No. A32.

STANDARD TOOLS FOR BROACHING KEYWAYS have been designed by Zagar Tool, Inc., to be used on short stroke broaching ma-



chines in plants where there are many different sizes of holes with many different sizes of keyways, all to be produced in production quantities. It is now possible to make keyways ½" wide x ¼" x 4" long on 20" stroke broaching machines, and keyways up to 1" wide x ½" deep x 6" long on 36" stroke machines. For information on how to solve your keyway broaching problem, write to ZAGAR TOOL, INC., Dept. TD-N, 23880 Lakeland Blvd., Cleveland 23, Ohio.
Inform-A-Gram Key No. A33.

AN ELECTRIC MICROMETER, for both the usual measuring and gaging operations and for telemetering to get remote indication of small movements, is being manufactured by



Stevens-Arnold Inc. The micrometer is arranged for battery operation and consists of a transmitter unit and a control unit, together with connecting table. There are no tubes or amplifiers. Controls consist only of one adjustment on the transmitter and two on the control unit. For fuller information write to STEVENS-ARNOLD INC., Dept. TDJ, 22 Elkins St., South Boston 27, Mass.
Inform-A-Gram Key No. A34.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

SUPEREAM

REAMERS IN *Decimal* SIZES

▼ 470 individual sizes carried in stock in variations of .001 from .032, .033, .034, .035, .036, etc., all the way up to .501; Any size required larger than .501 . . . blanks can be ground to your exacting specifications, delivered in 3 or 4 days. By purchasing SUPEREAM Reamers in steps of .001 you SAVE time, labor and money in the cost of extra machining and lapping. SUPEREAM Reamers all have ground and polished flutes and are held within .0002 tolerance.

IN EMERGENCY
PHONE INDEPENDENCE 3-9180

Reamers are also furnished in Right-hand spiral, Right-hand cut, as well as Left-hand spiral, Right-hand cut. These specials are delivered in 3 to 4 days.

Write for descriptive literature and prices.

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OCTAGONS, BILLETS AND FORGINGS FOR PRODUCTION,

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HY-TEN

"M" TEMPER ALLOY STEEL

for maximum machinability and minimum heat-treat distortion. It has great toughness at high degrees of hardness and long-wearing properties for lowest unit cost. For complete information on HY-TEN alloy steels, write for FREE DATA BOOK.

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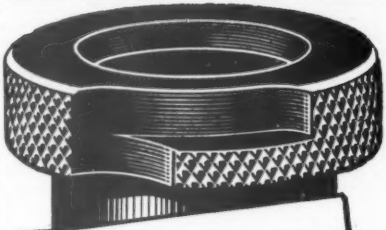

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DRILL JIG BUSHINGS

A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring screw holes.

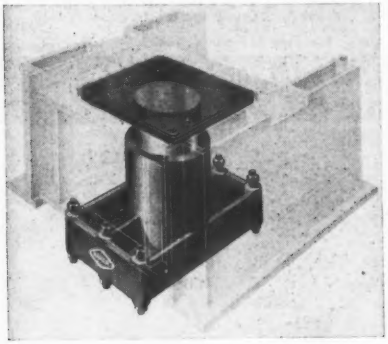
The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in 3/16" to 1" diameters.

Send for price list.

HEIMANN MFG. CO.
Dept. T
Urbana, Ohio

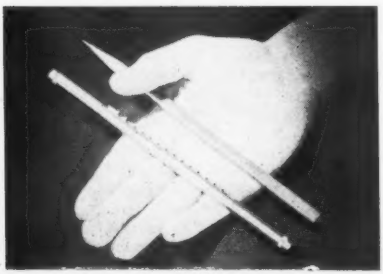
PROGRESS ON PARADE

PNEUMATIC AND HYDROPNEUMATIC DIE CUSHIONS have been added to the line of Baker Brothers, Incorporated. These new die cushions are for all types of power presses. The pneumatic cushions are offered in standard sizes from 4" through 28" diameter in the

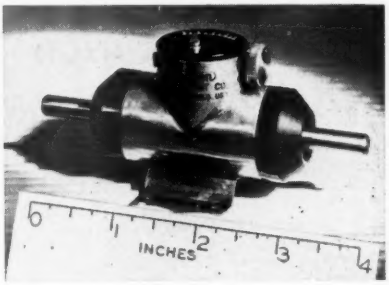


single-piston type and from 10" through 30" diameter in the double-piston type—the size and number of cushions in a given installation depending on the individual press bed construction and pressure requirements. The company's hydro-pneumatic cushions are always self-contained and can be supplied to fit any press, regardless of size or make. BAKER BROTHERS, INC., Dept. B, 1000 Post St., Toledo, Ohio.
Inform-A-Gram Key No. A35.

A PENCIL-SIZE "GLENNY" BROACH is now being manufactured and sold by The Kase Machine Company. This new, small precision tool is capable of cutting 1/16" wide keyways up to .070" in depth. It incorporates all of the features of the standard Glenny broach, formerly made by East Shore Machine Products Company. This pencil-size broach features protected blade, simple operation, chatter elimination, absolute center, maximum adjustability of cutting depth and rapid keyway cutting. Address THE KASE MACHINE CO., 18441 Buffalo Ave., Cleveland 19, Ohio.
Inform-A-Gram Key No. A36.

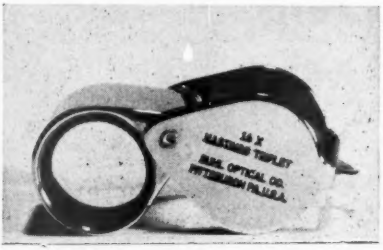


A MINIATURE ADJUSTABLE-SPEED DRIVE has recently been introduced by Metron Instrument Company. This speed changer has created new design possibilities since hitherto adjustable-speed features in low power drives were often ruled out due to large size and weight of existing units. The Metron drive weighs less than six ounces, can be hidden inside your hand, and yet can deliver up to 70 ounces-inches torque and .025 hp. Write to



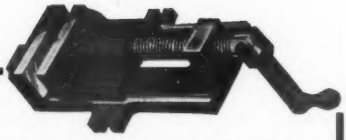
METRON INSTRUMENT CO., 431 Lincoln St., Denver 9, Colorado.
Inform-A-Gram Key No. A37.

NEW INSPECTION MAGNIFIER. A folding magnifier, which contains three lens elements of different characteristics cemented together, has been designed by Buhl Optical Company.



These elements give a true flat field of ½", free from color fringes and distortion of image such as is inherent in the usual type magnifier. This light, compact pocket instrument magnifies 14 times and gives wide angle view. It folds into a self-contained, high quality, chrome-plated case, with loop for chain. Write for price and other details to BUHL OPTICAL CO., 1011 Beech Ave., Pittsburgh 12, Pa.
Inform-A-Gram Key No. A38.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION



YOST DRILL PRESS VISE

● This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

OFFERED IN TWO SIZES

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	23

Do you need a vise of ANY type?

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SCHERR *aids to precision – production*

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TOOLMAKER MICROSCOPES
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SEE ADVERTISERS INDEX, PAGE 71, FOR KEY NUMBERS

MAKE YOUR
DIES
The Oliver Way

OLIVER BENCH MODEL

The Oliver Die Making Machine is adaptable to light or heavy sawing and filing operations on tool steels up to 1" thick. It stands up — many units have been in continuous use for more than 25 years, cutting direct labor costs from 50% to 60% on dies, gages, templates, etc. A Heavy Duty model is available for work on steels up to 3" thick.

Send for Free Illustrated Bulletin

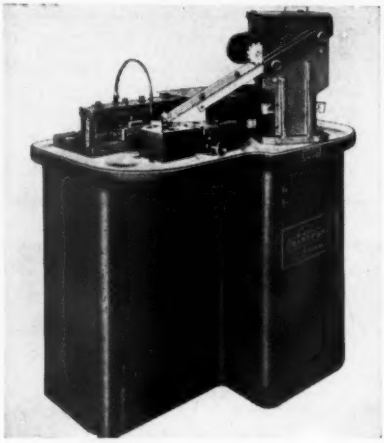
Oliver Instrument Co.
1436 E. Maumee Adrian, Mich.

IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION
OLIVER
OF ADRIAN

New Thread Roller

A new high production thread roller, for machine screw sizes from No. 2 to No. 10, which will produce from 120 to 150 pieces per minute, has been developed by Hartford Special Machinery Company. Thread length capacity is ⅛" to 1½". The machine will roll threads on common screws, gimlet point and self-tapping screws, wood screws, screwnails, socket head cap screws and drive screws, as well as handling unlimited special applications.

This model, 190-H, rolls Class 3 Thread Fits consistently, limited only by the accuracy of the blanks used. Dies used are standard sizes of the flat, economical type. Die pockets are precision fitted, eliminating the necessity for shimming and squaring. To control the thread fit accuracy, dies can be adjusted while the machine is running. Die changeover is rapid and simple. Two clamps hold the moving die, and only one clamp holds the fixed die.



Outstanding features incorporated in the machine design include the automatic hopper feed with notched clearing wheel and filtered lubrication system, carrying to all important parts and supplying clean cutting oil to dies.

Write for full details to HARTFORD SPECIAL MACHINERY CO., 281 Homestead Ave., Hartford 5, Conn. **Inform-A-Gram Key No. D1.**

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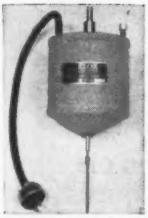
Low-Priced

ELECTRICAL *Broken Tool* REMOVER



Only **$95**

It's sensational — Every shop, every tool crib should have one. Removes broken tools and studs by electrical disintegration from a part being machined without damaging the part. Saves castings otherwise scrapped. Set it up on your drill press.

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MIRROR FINISHES
in Minutes instead of Hours

On Tungsten Carbide, Tool Steels, Special Steels, Chrome, etc.

WITH *STAR DUST*

Laboratory Graded

Pure Diamond Powders and Diamond LAPPING COMPOUND

Produces super-finishes and polishes down to less than a MICRO-INCH with INCREDIBLE SPEED.

Write us your lapping problems. No obligation.

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139 DUANE STREET • NEW YORK 13, N. Y.

FOR FAST, ECONOMICAL
SOFT-METAL MELTING

THE JOHNSON

No. 616
Melts 600 lbs. lead in 29 minutes

The fastest atmospheric fired furnace on the market. The JOHNSON No. 616 is designed to save time and gas in melting soft metals such as lead, babbitt, tin, zinc, aluminum and type-metal. Equipped with powerful JOHNSON Direct Jet Burners each having separate pilot light and shut-off control.

Economical in operation. Uses 6 burners to develop melting temperatures up to 1500°F., 3 burners to hold temperature at working level. Cuts melting time in half. Saves gas. Heavy insulation retains heat and reduces operator fatigue. Complete with removable cast iron pot.

F. O. B. FACTORY $148.00

Complete CATALOG **. . . Free JOHNSON Catalog describes all time-saving cost-cutting JOHNSON Furnaces for pot hardening, melting, heat treating. Write today.**

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575 E AVENUE N. W., CEDAR RAPIDS, IOWA

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and Punching Attachments for All Makes of Press Brakes
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DRESEL-BETZ CO.
Belleville, Ill.
Designers and Manufacturers of Tools, Dies, Jigs, Fixtures, Metal Stampings

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New Jersey

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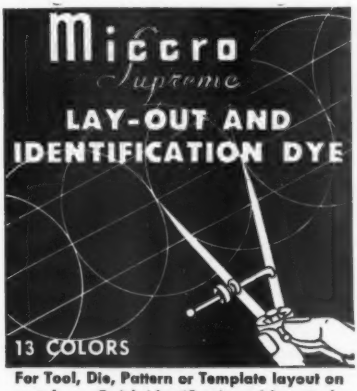

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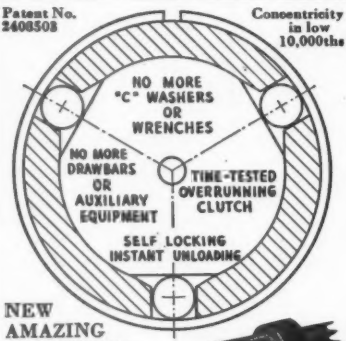
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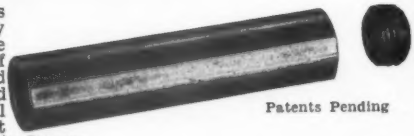

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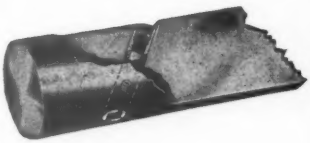

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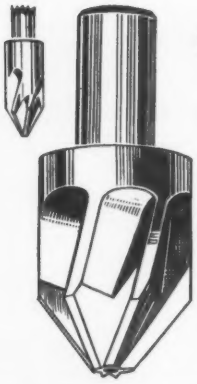

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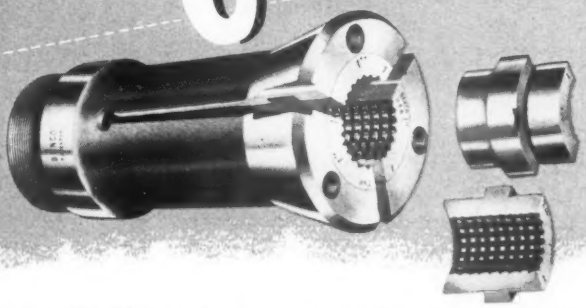

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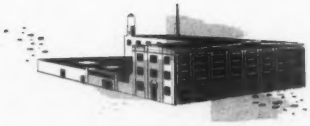

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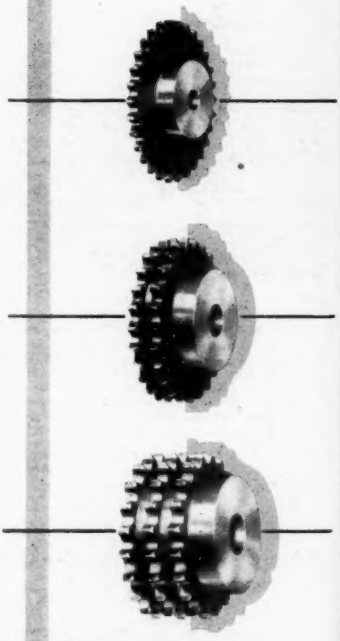

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